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Tourism wetlands and rural sustainable livelihood: The case from Iran

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ABSTRACT

This study aiming to explore livelihood effects of wetlands on people's livelihood. The area of study, Zarivar wetland, is located in western Iran. The research carried out in a quantity–quality approach conducting library and field studies along with questionnaire and a focus group discussion. Based on the results, the wetland has had a great effect on residence's life in five dimensions of livelihood capitals i.e. financial, natural, human, physical, and social. Among the livelihood strategies from the wetland, the strategy of diversity of livelihood and income activities had greater importance for local households. Also, a positive and significant relationship recognized between livelihood capitals arising from the wetland and household livelihood level. Regarding the results of path analysis, the natural capital has the greatest effect on people's livelihood showing the crucial role of livelihood capitals from the wetland in determining their livelihood level and dependency on functions and services of the existing ecosystem.

Management implications: If tourism development should improve the livelihood of the local population, an integrated development and conservation strategy must be implemented, based on:

- A strong public-private partnership in tourism with participation of local people,
- Local engagement in conservation to ensure fascinating nature experiences for tourists,
- Sufficient financial resources to achieve conservation goals and to start tourism development,- Education and learning processes to encourage the shift from an agricultural to a non-agricultural production

1. Introduction

Achieving multiple goals of sustainable rural development with a balance in utilizing natural resources, offering environmental services, securing rural livelihood, and increasing both agricultural products and non–agriculture economic has turned into a great challenge across the world in the recent decades (Erenstein & Thorpe, 2011; McLennan & Garvin, 2012). Therefore, understanding the relationship between resources, poverty and livelihood sustainability has been regarded to be significant in rural development. Consequently, the sustainable livelihood strategy was introduced in 1980s as a new strategy to reduce or eradicate the rural poverty (Conroy & Litvinoff, 2013; DFID, 1999; Ellis & Biggs, 2001).

Scoones (1998) believes that it is important to identify the combination of different assets and livelihood resources in the formation of any livelihood pattern. In other words, rural livelihood depends on natural and social assets or tangible and intangible capitals owned by the rural people. The most important and influential grounds to proceed development in rural areas is to identify the livelihood situation of households, local access to livelihood capitals, and factors influencing their livelihood. Environmental or natural resources are considered to be the main asset for rural people and this resources provide high multiple economic values helping to attain better welfare in rural areas (Barbier, 2011; Fisher, Turner, & Morling, 2009). Wetlands are seen as the most productive ecosystem and have a critical role to play in supporting and developing people livelihoods, reducing poverty, improving food security and in the wider context contributing towards sustainable development (Wood, , Dixon, , & McCartney, 2013). A wetland is a valuable natural ecosystem that offers both direct and indirect livelihood assets for local people especially for improving ecotourism capability. Tourism helps to change the attitude of local people towards biodiversity conservation and also their denedency on natural resources maight reduced. It is argued that local small scale ecotourism investments isoften regarded as a means for enhancing people's

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livelihoods around protected areas (Nyaupane & Poudel, 2011). However, there has been little attention to their socio-economic importance in the improvement of people life quality.

Different aspects of wetlands has been considered by researchers but the innovation aspect or novelty of this research is to assess the impact of this type of tourism ecosystem on the various dimensions of livelihood assets and, ultimately, the sustainability of household livelihoods, which has less been studied, especially using Sustainable Livelihood Framework (SLF). Zarivar wetland is one of the most important wetland in the west of Iran which has been paid attention to from different economic and livelihood, tourism, fishing and recreational activities and socio-economic values due to specific environmental features. In addition to its beauty and tourist-prone, the wetland plays an influential role in producing various agricultural products and local people's livelihood. Regarding the paucity of knowledge on the effect of wetlands on different dimensions of rural livelihood and their livelihood systems, this study aims to explore the effects of such tourism capability on rural households' sustainable livelihood living around through sustainable livelihood strategy. This study aims to provide insights on how families living in wetland margins enhance their livelihood through the wetland capacity mainly from both tourism and agricultural related activities. In order to achieve this goal the concepts of "ecotourism" and agricultural activities seen as two main sustainable livelihood strategies. And consequently, how do the findings of the study contribute to enhancing conservation and livelihood development of the tourism wetland?

2. Ecotourism and rural livelihood

The contribution of ecotourism to rural livelihoods and livelihood diversification has received significant research attention in recent decades (Kimengsi, Kechia, Azibo, Pretzsch, & Kwei, 2019). In this regard, sustainable livelihood (SL) is perceived as an effective strategy to improve the economic and social situations of rural areas, sustainable livelihood, and reducing rural absolute poverty, a livelihood is sustainable while it can cope with and recover from stresses and shocks, maintain or enhance capabilities and assets, and not undermining existing natural resource and provide SL opportunities for the next generations (Scoones, 2009). Among other things, an SL approach involves the development of short-term coping mechanisms and longer-term adaptive capacities that enhance the abilities of individuals and communities to deal with changing circumstances (Chambers & Conway, 1992). Although, it is often considered as a way to examine the rural poverty condition and their existing assets, however, the main focus of SL framework is a base for the analysis of determinants influencing livelihood and livelihood processes (Ashley & Carney, 1999; Xu et al., 2015). The SLF has the capability of analyzing the effect of the local assets or capitals on the all aspects of rural people's life. Among common sustainable livelihood frameworks, it seems that the pentagonal SLF, introduced by the Department for International Development (DFID), comprehensively covers the concept of sustainable livelihood; hence it is a suitable pattern for livelihood analysis (Shen, 2009). The framework's five key concepts include vulnerability, livelihood assets, structures and processes, livelihood strategies and livelihood outcomes (Bunning, Mcdonagh, McGarry, Liniger, & Rioux, 2009; Krantz, 2001; Mahdi & Schmidt-Vogt, 2009; Serrat, 2010).

In this framework, "capitals" or "assets" are the central core; and the interaction between different assets of livelihood are key elements to convey deeper insight of sustainable livelihood (Fang, 2013; Zenteno, Zuidema, de Jong, & Boot, 2013). Based on the livelihood strategy, the five assets of rural livelihood constitute the ground for empowering the rural people and reducing households' poverty. From the previous studies, it can be understood that these assets have widely been used to assess the livelihood sustainability (Chen et al., 2013; Cinner, McClanahan, & Wamukota, 2010; Glavovic & Boonzaier, 2007; Paul & Vogl, 2013; Tao & Wall, 2009). "Vulnerability" in the mentioned framework refers to the vulnerable grounds of hard situations influencing the lives of the poor especially in the deprived areas and expresses the insecurity of family, individual and society welfare in confronting with environmental changes. Undoubtedly, family livelihood accompanied by their access and control over assets can be influenced by the vulnerability grounds which are often out of family's control (Cahn, 2006; Glavovic & Boonzaier, 2007; Hossain, Reza, Rahman, & Kayes, 2012). The framework helps people to confront with the incoming changes, and diversify their activities to increase flexibility against the unpredicted changes (Reed et al., 2013). "Livelihood strategies" as the third concept in the intended framework refers to a set of activities which local people implementing to attain their livelihood based on the assets, vulnerability and the system in which they live (CHF, 2005; Fang, Fan, Shen, & Song, 2014; Masud, Kari, Yahaya, & Al-Amin, 2016). These strategies are, in fact, the choices and activities which result in collection and conversion of these assets (Morse & McNamara, 2013). The strategies from Xu et al. (2015) point of view are: only agriculture, both agriculture and non-agriculture, and only non-agriculture and non-labor so may contain using natural resources to earn money and income in a direct relationship with rural households' livelihood; and defining sustainable livelihood of rural households especially low-income ones (Babulo et al., 2008; Kamanga, Vedeld, & Sjaastad, 2009; Karamidehkordi, 2012). More recently, research has emerged that highlights the use of ecotourism as a strategy in some countries especially in rural areas (Açiksöz, Cetinkaya, Uzun, Erduran Nemutlu, & Ilke, 2016; Che, 2006; Hurley & Halfacre, 2011; Iorio & Corsale, 2010; Kimengsi et al., 2019; Tao & Wall, 2009), as well as in tourism and ecotourism partnerships as a way to address fiscally stressed governments and organizations in rural peripheral regions. The last concept of sustainable livelihood framework is "livelihood outcomes" including the successes and objectives that the livelihood strategies attain. These outcomes can enclose surge of revenue, increase of well-being, reduction of vulnerability, reduction of inequality, improvement of food security, and enhancement of environmental sustainability (Babulo et al., 2008; Serrat, 2010).

In most rural areas, there is often a strong and complex relationship between natural resources and people's livelihood; as their life is dependent on these resources (Nguyen, Do, Bühler, Hartje, & Grote, 2015). In some studies, it was found that local and traditional livelihood methods have greatly been alternated by ecotourism, which has become the primary livelihood strategy for the resettled community (Su, Wall, & Xu, 2016). The concept of ecotourism is seen as an complex relationship between conservation and livelihoods. According to the relevant literature, better conservation of natural resources and improved level of development are believed to be guaranteed when indigenous people engage in nature-based tourism. However, unequal distribution of the ecotourism gains, low levels of social and financial capital and lack of land security stops indigenous people to benefit from ecotourism programs in reality (Coria & Calfucora, 2012). Promotion of local livelihoods through ecotourism has been widely considered as an important policy instrument for biodiversity conservation. But, ecotourism has become a hotly debated topic since its implementation across countries because of the mismatch in vision and practice. While ecotourism is regarded as an important policy instrument for biodiversity conservation in theory, it has been very controversial in practice (Das & Chatterjee, 2015).

The relationship between community and wetland continues till today as provisioning services are increasingly developed; and as wetlands play ever greater roles in livelihood diversification of poor (Wood et al., 2013). There are many examples in this regard across the world. Lamsal, Atreya, Pant, and Kumar (2016) believe that the incorporation of the pro-poor tourism thought in nature tourism intervention could improve livelihood benefits for poorest groups, which could play an important role in the conservation of biodiversity and local ecosystems in developing countries. They also state that tourism may does not lead to positive outcomes all the time (Lamsal et al., 2016). Ugandan-based wetland activities account for more than 50 percent of the monthly income of its dependent societies. On the other hand, roughly 90 percent

of the population of the Godavari Delta, in the province of Andhra Pradesh, are entirely dependent on wetland production for their livelihood sustainability (Lamsal, Pant, Kumar, & Atreya, 2015).

In Iran, wetlands are regarded as both main resource ecotourism and similar to other countries, the direct function of wetland also includes providing freshwater, irrigation and livestock grazing. Furthermore, wetland farming is a crucial career among rural communities as the wetland provides good cultivating conditions for crops such as rice, corn and vegetables (Dahmardeh & Shahraki, 2014; Kinaro, 2008; Nabahungu & Visser, 2011). As Nabahungu and Visser (2011) believe, use of wetlands by rural people depends to a large extent on the natural conditions of the wetland, the socio-economic status of the communities, and the political and historical context of the country.

Wetlands have provided considerable opportunities for tourism and providing socio-economic benefits to the governments, the tourism industry, and the local communities, and the profits has been used as a foundation for their conservation (Lamsal et al., 2016). They also provide a wide range of economical (tourism opportunities, water supply, fishery products, agricultural potential, forestry potential, transportation), social (visual quality and aesthetic, educational potential, recreation and ecotourism, social relationship), environmental and cultural benefits. Sharma, Rasul, and Chettri (2015) state that the economic benefit generated from provisioning services from the Koshi Tappu Wildlife Reserve in Nepal accounted for about 85%. Gandarillas, Jiang, and Irvine (2016) in their study have characterized and highlighted the socio-economic importance of high mountain wetlands in relation to the livelihood and indigenous culture of local human settlements and believe that the wetland had some economic benefit such as livestock grazing, economic value of cultural and natural heritage and sense of aesthetics, and water supply for the area.

The ability of communities to utilize such livelihood capitals as well as the services of the wetland ecosystem will determine the quality of livelihood strategies in its surrounding area. On the other hand, people have access to different levels of, and a combination of assets, face some important choices in choosing their livelihood strategies that ultimately lead to livelihood or livelihood changes in the welfare state (Scoones, 1998; Kumar et al., 2011; DFID, 1999). In summary, the values and functions of wetlands are shown in the following Table 1.

3. Materials and methods

3.1. The context of study area

The Zarivar wetland is located in 3 km northwest of Marivan county, Kurdistan province, Iran at 35˙, 30′,6″ N and 46˙, 10′,47″ E, with an area of 1740 ha and hydro capacity of 42.7 million m^3 at max and min volume of 30–60 million m^3 (Fig. 1). The wetland enjoys beautiful landscape, attractive natural view and competence. There are around 200 plant species in the area; while farming lands and villages are situated in the external part of the wetland. The ranches around the wetland provide forage for animals. The variety of plants in the region shows the high potentiality of the region for agricultural production. The mangrove forest is also a resource of exploitation which the farmers use its items for house roofs, animal foliage, animal farms' roof coverage, and handicrafts including basket making and reed curtain. The forest vegetation around the wetland is 3434 ha, the most important function of which is to protect soil and water ecosystem and support people's livelihood.Totally, more than 130,000 tons of dry foliage are harvested from the ranches and forest areas (Behrozirad, 2009, p. 798).

The existence of fertile lands on the margin of the wetland with abundant water, high precipitation (980 mm annually) and great topsoil of sloped lands have provided the potential of rained cultivation with a variety of products (Asarab Consulting Company, 2007, p. 116; Behrozirad, 2009, p. 798). At present, a dam has been built on the wetland to provide an irrigation network and drainage for 1800 ha of south lands, fishery hatchings and recreational purposes. The fishing capacity of wetland can make the region the fishing pole and provide many job opportunities for people with 300–400 tons of fish products. Therefore, the natural landscapes and smooth beaches along with a mountainous reef covered with trees and sufficient freshwater make the region attractive to bring in a remarkable number of visitors or tourists that consequently have some benefits for local people(Organization for the Environment of Kurdistan province, 2016).

3.2. Sampling method and data collection

In order to achieve the research objectives, both qualitative and quantitative research methods were used in which the qualitative research method was applied to complement the quantitative research method and also in a convergent manner to support the quantitative findings. The Sustainable Livelihood Framework (SLF) considered to structure the analysis of the qualitative and quantitative data according to several author's work (Adato & Meinzen-Dick, 2002; Morse & McNamara, 2013; Simpson, 2007). The Sustainable Livelihood Framework is best applied when working with qualitative as well as quantitative methods. This framework helps to place observed household practices in the context of rurals' access to capital assets and their vulnerability context. This analytical framework allows an assessment of

Table 1
The relation of ecological function of wetlands with livelihood assets.

Ecosystem services of wetlands	Livelihood assets				
	Natural	Physical	Human	Social	Financial
Provisioning	Food and water security (subsistence), Drinking water for human and livestock; water for agriculture; food for humans and livestock	Contribute to infrastructure	Wetlands and human health: medical products	Water social institutions (cooperative water users) and wetlands (forests and pastures associations)	Products for trading: Food for humans; food for livestock; water, Reed, fiber and peat; medicinal plants
Regulating	Water purification; flood control; flood storage; soil; sediment and nutrient retention; coastal shoreline stabilization; storm protection; carbon storage	Flood control; flood storage; coastal shoreline stabilization; Water Infrastructure	Biological control agent for pest diseases	–	Insurance value of wetlands: Coastal shoreline protection; carbon storage
Cultural	Recreational hunting and fishing; cultural heritage; knowledge systems; other recreation and tourism	–	Wetlands and human health: Educational values; aesthetic and sense of place values; knowledge systems	Recreational hunting and fishing; cultural heritage; spiritual and religious values	Revenue generation Opportunities, Other recreation and tourism
Supporting	Primary production; nutrient cycling	Support all ecosystem services and livelihood assets			

(Clarkson, Ausseil, & Gerbeaux, 2013; Euliss et al., 2006; Kumar et al., 2011; Millennium Ecosystem Assessment, 2005; Millennium Ecosystem Assessment, 2003; Ramsar, 2009; Schuyt, 2005).

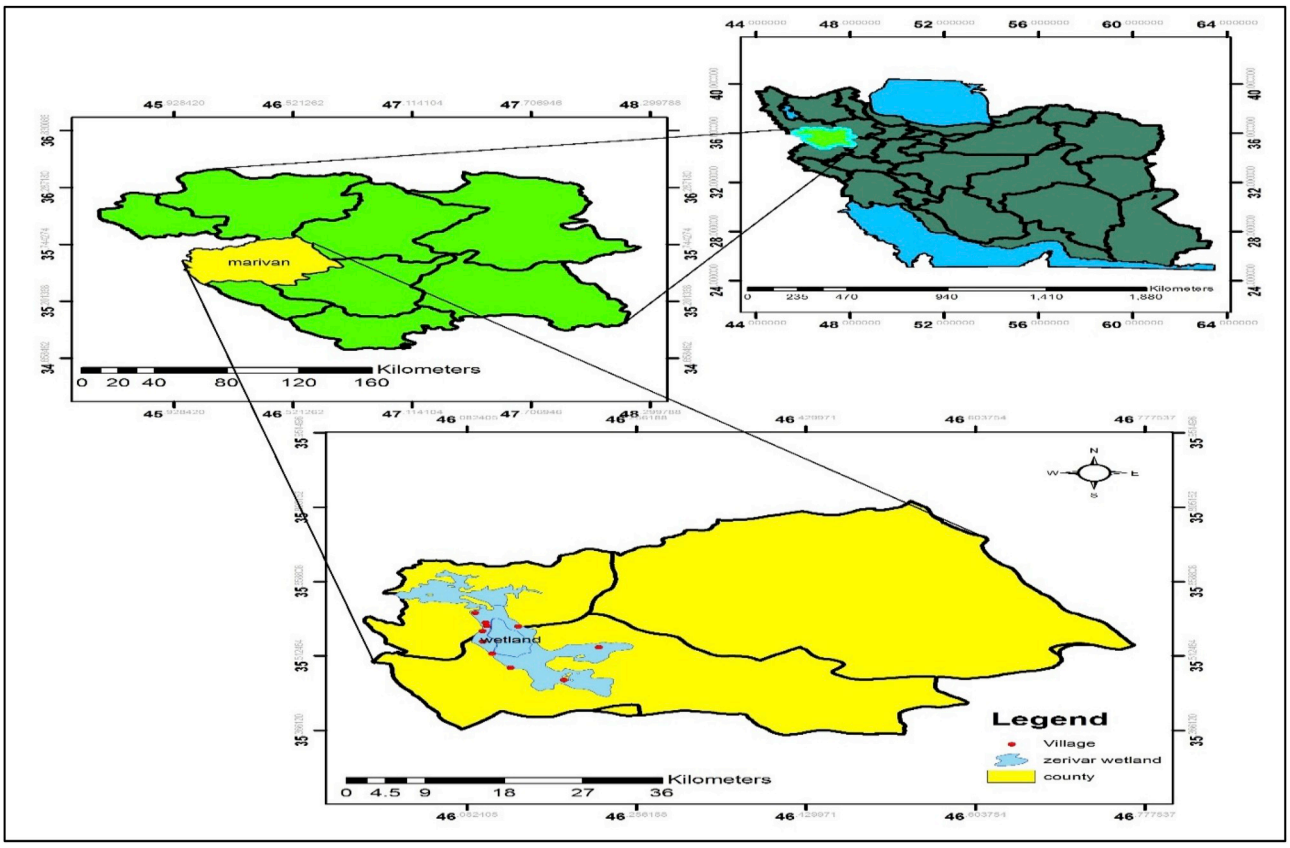

Fig. 1. Location of the Zarivar wetland and the villages around it in Marivan, Kurdistan, Iran.

the importance of these capital assets and reconciling processes to determining livelihood outcomes in terms of incomes, food security and basic needs.

In order to collect necessary data from the field a close-ended researcher-designed questionnaire and then was developed based on past relevant studies (Allison & Horemans, 2006; Carney, 1998; Chen et al., 2013; Fang et al., 2014; Iorio & Corsale. 2010; Masud et al., 2016; Paul & Vogl, 2013; Shen, 2009; Tao and Wall, 2009). The questionnaire containing three aim sections i.e. A, B and C. Section A consisted of information pertaining to the demographic characteristics of the respondents such as gender, age, marital status, occupation, household size etc. The section B consisted of information relating to the livelihood assets and strategies of wetland community such as human, social, financial, environmental, and physical assets and livelihood strategies to generate their income. Finally, section C contained information relating to the vulnerability context of wetland community development. Vulnerability context itself divided into three type, namely Shocks, Trends, and Seasonality.

The survey was conducted from October 2017 to February 2018. The questionnaire were distributed and collected through face-to-face interviews.

In the next step, a village survey was conducted using group discussions with 5–10 individuals containing village council members, knowledgeable old people, and ordinary people. A total of seven FGD sessions were conducted with each session lasting approximately 2 h. Group discussions were conducted based on livelihood strategies (i.e. both ecotourism and agricultural related act, income sources, perceptions of change in income strategies and activities, social welfare, ecotourism, natural resource conditions (forest, woodland, and pasture)), existing vulnerabilities and land use and management. Finally, after encoding and comparing the discussions and viewpoints of the participants and analyzing and interpreting the information obtained, the discussed issues were divided into several dimensions according both the results from quantitative survey and some key questions raised from early qualitative survey. Direct field observations were carried out during the field surveys as well.

3.3. Pilot study

Seven villages located in the margins of Zarivar wetland were chosen as the area of this study. In order to improve the questionnaire and to ensure content validity of the measurement scales of the wetland attributes as well as to test content reliability using the modified measurement scales prior to the final questionnaire a pilot study of thirty heads of households drawn from the sample was held. Also based on the pilot study, therefore, the sample size was determined as 230 households. The sample size was estimated at 95% confidence level with the margin error equal to (0.05). Moreover, the proportional allocation sampling method was used to make a proper distribution of the sample in the selected villages.

3.4. Measurement of livelihood assets and strategies

Several studies have applied a variety of household variables to identify households' livelihood strategies. In this study, households livelihood strategies were quantitatively defined based on the activity choice approach which has been applied by Nielsen, Rayamajhi, Uberhuaga, Meilby, and Smith-Hall (2013). According to these researchers, livelihood strategy is a combination of the income generating activities a household pursues to sustain or improve its livelihood. Accordingly, main livelihood activities related to tourisms (ecotourism) and not-related to tourisms (incomes from agricultural and livestock activities, fisheries, and wetland production) were defined as shown in Fig. 2.

Necessary variables of each asset were determined according to their

definition, literature review, and socio-economic features of the study area. Thus, the questionnaire was adjusted to socio-economic features of the study area through eliminating insignificant variables and adding localized variables. Finally, 14 dimensions were taken into consideration to describe the attributes of five livelihood assets. Natural asset were measured in 4 dimensions (24 items), human asset (2 dimensions, 12 items), social asset (3 dimensions, 15 items), physical asset (2 dimensions, 10 items) and financial asset (3 dimensions, 18 items) on a five-point Likert response scale that ranged from one (extremely low) to five (extremely much).

3.5. Data analysis

Structural Equation Modeling (SEM) was utilized to analyze the data using SPSS and LISREL 8.8. SEM is an approach that consists of two steps including the measurement model and structural model (Anderson & Gerbing, 1988). SPSS version 20 was used for descriptive-analytical statistics and determining the underlying structure of perceived benefits of wetland (in the form of livelihood assets) attributes using an confirmatory factor analysis (CFA(.The most important goal of confirmatory factor analysis is to determine the fit of the predefined factor model with a set of observed data. SEMs were employed to estimate latent variables (CFA), test the causal relationships between among variables using a single set of equations, estimate and attenuate for measurement error in the data, in both measurement and structural levels (Hoyle, 2012). The evaluation of model adequacy was based on the Chi-square statistic ($\chi 2$), comparative fix index (CFI), normed fit index (NFI) and root mean square error of approximation (RMSEA).

In the next step, to explore the relationships of the household capitals from the Zarivar wetland with level of household livelihood the Pearson correlation coefficient was used. Path analysis technique is a method used to determine the direct, indirect or ineffective effects of variables in the causal system on each other (Saei, 2007) and its diagrams are a combination of path sets and each of these paths is specified by the path coefficient. The path coefficient is equivalent to the beta coefficient, which is the standardized weight of the regression. This coefficient represents the weight of the independent variable in explaining the dependent variable. Therefore, path analysis was used to determine the contribution of independent variables in explaining the dependent variable and to determine the direct, indirect or ineffective effect of the variables studied in this research (Table 2).

4. Results and discussion

Out of the 230 participants in the survey conducted, only 3.9% were female; perhaps because the heads of the households were selected as the unit of the study. Results showed that the average age of the participants was 44, mostly from 36 to 45 years old. The household size largely ranged from 2 to 4 people. In terms of education, 24.8% of the respondents were illiterate, and only 8.7% of them had a bachelor's degree or higher. A substantial group of them (37.7%) mentioned agriculture as their main occupation. A majority of the participants (60%) had a second job, as well. In terms of revenue, almost 50 percent of the respondents evaluated it was either medium or high. The results revealed that the less-advantaged households earned more than 80 percent of their income from wetlands, while the ratio for medium and high-income households were 75 and 43 percent; respectively. Some assessments on the economic contribution of wetlands also confirm the continued importance of these areas, for example in Zambia (Seyam, Hoekstra, Ngabirano, & Savenije, 2001) and Kilombero valley in Tanzania (McCartney & Van Koppen, 2004). Finally, the demographic trends in the study area showed an increase in the number and size of households over a period of 20 years (5.2–6.1%). This trend may reduce the biological capacity of the wetland in the future, and could be regarded as a challenge to sustainability in the region.

4.1. Effects of Zarivar ecotourism wetland on the households' livelihood capitals

In order to evaluate the significance and fitness of the model of Zarivar ecotourism wetland impact on the livelihood assets or capitals in the study area, the second order confirmatory factor analysis (CFA) was applied. For this purpose, the model of the wetland with five factors (structural) and totally 14 dimensions (marker) was introduced into the second order confirmatory factor analysis (Table 3). In the model of the measurement, the latent variable was "sustainable household livelihood" and the exogenous variables included the five capitals. Fitted model of the wetland's impact on households' sustainable livelihoods, along with standardized factor loads (Fig. 3), and in significant terms (Fig. 4), were derived from a second-order confirmatory factor analysis. Byrne (2013) similarly recommends the comparative fit index (CFI) and normed fit index (NFI) be greater than 0.90 for a good fit and values greater than 0.95 indicate a very good fit. The root mean square error of approximation (RMSEA) values less than 0.05 suggest good model fit and values up to 0.08 indicate adequate model fit considering narrow confidence intervals. When considering model accuracy, fit indices should be interpreted as guidelines that also account for theoretical, statistical, and practical considerations (Byrne, 2013).

Multiple fit indices were examined to assess how well the model fits the data. The resulting measurement model confirmed that the proposed model was found to fit data well: ($\chi 2 = 115.13$, $df = 72$, $p < 0.001$, NFI $= 0.951$, CFI $= 0.964$, and RMSEA $= 0.051$). As shown in Table 3, the standardized factor loadings revealed that they were greater than 0.30, which were statistically significant ($p < 0.001$) (Hoyle, 2012; Nunnally, 1978). It showed that the model was appropriate for measuring the impact of the wetland on the sustainable livelihoods of marginal households. Table 3 shows the standardized load factor load, standard error and route significance in the wetland model for sustainable livelihood in the villages of its margin.

It indicated the accuracy of the selected dimensions for assessing the impact of the Zarivar wetland on the sustainable livelihood of the respondents. The significance and fitness of the model, in the form of five capitals, was also confirmed for measuring the impact of the wetland on the sustainable livelihoods of the rural people. In order to investigate the priority of the effect of the five capitals in the sustainable livelihoods of households, the standardized path coefficient (λ) and its significance level were used for each of the five mentioned capitals. The standardized path coefficients can indicate the intensity of the relationship between the first and the second order factors. Accordingly, the natural capital ($\lambda = 0.81$, $\mathbf{t} = 6.46$) was found to be the strongest indicator. This reveals that natural capital aspects has been indicated from the respondent point of view as the major asset of the wetland that comprises sources for both ecotourism and agricultural activities. Other capitals were also important for measuring the sustainable livelihoods of the households in the following order: the financial capital ($\lambda = 0.79$, $\mathbf{t} = 5.96$), the social capital ($\lambda = 0.71$, $\mathbf{t} = 5.36$), the physical capital ($\lambda = 0.64$, $\mathbf{t} = 4.64$) and the human capital ($\lambda = 0.52$, $\mathbf{t} = 4.22$).

Related to this, in the qualitative section of the study, the participants emphasized that most of the wetland services have been in the area of natural capital, similar to survey results. In their words, the wetland provided necessary resources for them for agriculture and animal breeding, and especially landscapes for ecotourism as well as other productions (such as fish, reed, pit, herbs, etc.) that significantly contributed to the livelihoods of some households. As one farmer noted in a focus group discussion "wetlands are the lifeline of many a local farmer who feed on and sometimes sell wetland products". In similar studies, some research indicate positive effects of rural tourism and some reveals negative effects of it. Stone and Nyaupane (2018) believe that participation in tourism led to both increasing and decreasing community capitals. The increase of community capitals is explained by increased livelihoods improvement and diversification options facilitated by increased tourism income. The decreasing of capitals is

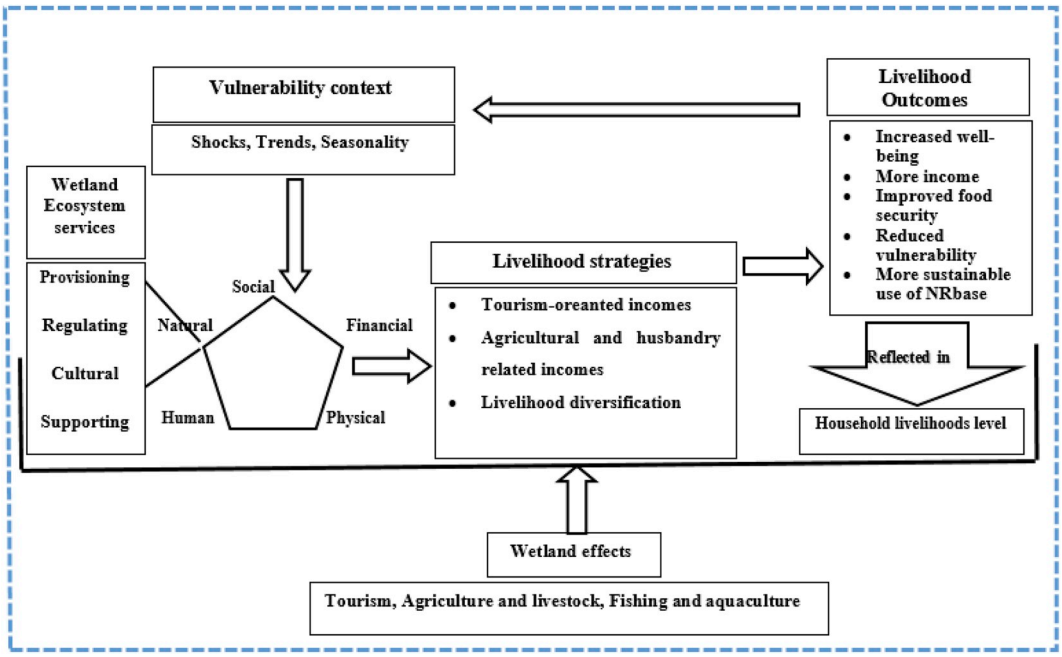

Fig. 2. The conceptual framework of the study.

explained by the heightened human conflicts.

4.2. The role of the ecotourism wetland in reducing households' vulnerability

Despite many cases of vulnerability in the study area and wetlands region stated by the respondents of this study, mainly: flood, drought, price increase, disease, seasonal shortages, increased waste, soil fertility reduction, air pollution and water quality, price fluctuations and production, lack of job opportunities, weakness of knowledge about the tourism industry, ecotourism refusal by local peoples, land use changes such as forests, pastures, agricultural land, lack of responsible organization over ecotourism, misuse of natural resource; the findings of the study showed that the wetland have somewhat contributed to the profitability of family-owned small businesses (tourist services, handicrafts, retail, etc.) and increased agricultural incomes, resulting in improving their livelihoods. It might be due to the tourism boost and high agricultural potential of the area. The participants in focus group discussions expressed that the wetland have provided some income sources for local people as in this regard multiple sources is often seen as an important factor in reducing vulnerability to tension, (Allison & Ellis, 2001; Tao & Wall, 2009). The people also believed that the wetland had contributed to the improvement of the basic infrastructure (road, electricity, ICT, etc.) and the development of the local market as well as the availability of desirable agricultural resources in the region leading to a diversification of products and higher food security.

On the other hand, as a natural ecosystem in the region, the wetland with a fair stabilization of the quality of the climate contributes to the reduction of droughts or its effects (Khayyati & Aazami, 2016). In relation to water supply services, it results in the stabilization of agricultural and livestock production, and improves the quality of household access to water. Constantly, as the largest lake of fresh water in the region, the wetland has the greatest impact on reducing the vulnerability of households and in this regard, has contributed greatly to the development of both ecotourism and agriculture sectors in the region. The study of the role of the wetland in protecting the ecosystem and biodiversity of the region, and decreasing soil erosion reveals its effectiveness in the sustainability of natural resources. The residents living around the wetland exploited other non-wooded products out of the surrounding forests, with a utilization rate of 450 kg per year in the foothill villages around the lake. Many studies have earlier highlighted the fact that forest resources could provide both a secure economic network and a direct source of income for local people (Scherr, White, & Kaimowitz, 2004; Soltani et al., 2012). Although local ecotourism had somewhat improved the livelihoods of locals, but its seasonality was considered as a weakness for their livelihood. As one of the participants said the "wetland is source of food industry that has never lost its chicken and fish, and whenever it wants to fish, the strength of its children is well prepared" the wetland has had many functions in food production.

Obviously, the results revealed that a large part of health services which are recently provided to the region resulted from the development of the wetland ecotourism. Then, the conservation activities have helped in reducing potential vulnerabilities. The qualitative part of this study suggested that the implementation of protection plans for the wetland ecosystem, such as the construction of sediment belts and check dams have been effective controlling floods, preventing land degradation, and increasing groundwater recharge. Moreover, the implementations of such actions have had a significant impact on rural people's relations and solidarity, their trust in each other and in the government, and their willingness for cooperation and formation of peoples' organizations.

While the wetland somewhat contributed to the improvement of the other capitals, led to deterioration of the wetland's characteristics and functions, regardless of implementing sustainability considerations. As one of the participants noted "You can see the wetland are the main attraction of this city (mariwan) and we are afraid that if we don't do anything it will disappear, so we need to protect it. [..] If we want to encourage the tourism activity we should keep the wetland and the villages margins clean".

4.3. The level of households' livelihood

In order to describe the livelihood level of the marginal households from the viewpoint of individuals, the subscales of livelihoods were used

Table 2
Indicators and variables explaining livelihoods, strategies, and vulnerability fields.

indicators	Definitions	The variables considered for this study	Literature
Natural capital	The natural resource stocks from which resource flows and services useful for livelihoods are derived	Natural landscape and ecotourism, conservation of natural resources and biodiversity, bird watching, traditional fishing, swimming, rafting Trekking, increase of land in irrigated crops, improvement of production performance, optimal resource management, development of water resources, rangeland production, implementation of participatory environmental projects, fish production.	Carney (1998), Allison and Horemans (2006), DFID (1999), Açiksöz et al. (2016), Gandarillas et al. (2016), Tao and Wall (2009),
Human capital	The skills, knowledge, ability to labour and good health that together enable people to pursue different livelihood strategies and achieve their livelihood objectives	Improve possible training in ecotourism development, enhancing environmental awareness, agricultural skills, livestock and livelihoods, learning new work experiences, improving physical and mental health, improving health services	Allison and Horemans (2006), Jansen, Pender, Damon, Wielemaker, and Schipper (2006), Fang et al. (2014), Masud et al. (2016)
Social capital	The social resources upon which people draw in pursuit of their livelihood objectives (networks, trust, membership of groups, extended families, clans, etc.)	Participation in religious and social activities, native people's ability of tourism development and management, community participation in tourism projects, membership in cooperatives, membership in associations and local groups based on natural resources, the possibility of exchanging knowledge and information between people and tourists, strengthening indigenous culture, people's trust in government agencies.	Tao and Wall (2009), Masud et al. (2016), Açiksöz et al. (2016), Nguyen et al. (2015), Jansen et al. (2006)
Physical capital	The basic infrastructure and producer goods needed to support livelihoods	Developing recreational facilities, development of rural environments and pedestrians, necessary infrastructure for tourism in nature, improving access to agricultural and fishing equipment, household access to water, electricity, roads and public transport development, market access, building capacity in communities to improve or develop their own physical asset	Shamekhi (2012), Allison and Horemans (2006), Kimengsi et al. (2019)
Financial capital	Financial resources that people use to achieve their livelihood objectives	Job fields, improving household income, return of ecotourism profit to local people, investment in ecotourism sector, diversifying income sources, increasing and diversifying crop and livestock production, and increasing the value of agricultural and livestock products.	Scoones (1998), Allison and Horemans (2006), Kimengsi et al. (2019), Masud et al. (2016)
Livelihood strategy	Are likely to focus on activities that generate income. The occupational pattern shows that some of the respondents have more than one livelihood activity	tourism-oriented and farm and husbandry related incomes (from agricultural and livestock activities, ecotourism, fisheries, and wetland production)	Tao and Wall (2009), Iorio and Corsale (2010), Nguyen et al. (2015), Babulo et al. (2008), Açiksöz et al. (2016)
Vulnerability Context	Shocks refers to some unexpected occurrences that might effects community livelihoods. Trends refer to changes over time in natural resource stocks and quality that impact on community livelihood. Seasonality refers to seasonal changes that constrain the livelihood choices of people	natural disasters (flood, drought), price increase, disease, seasonal shortages, increased waste, soil fertility reduction, conflict, air pollution and water quality, price fluctuations and production, limited job opportunities, lack of knowledge about the tourism industry, ecotourism refusal by local peoples, land use changes such as forests, pastures, agricultural land, lack of responsible organization over ecotourism, misuse of natural resource, less tourists.	Udayakumara and Shrestha (2011), DFID (1999), Shen (2009)
Livelihood outcomes		Household well-being, increased incomes, food security, reduced vulnerability and sustainable use of natural resources.	DFID (1999), Scoones (1998)

Table 3
The Confirmatory factor analysis of the sustainable livelihood model.

Factor		Dimension	Standardized load factor	t (sig.)
Natural capital	N1	arable land	0.52	–
	N2	water access	0.50	5.12**
	N3	air quality	0.51	4.45**
	N4	landscape & ecotourism	0.54	5.36**
Human capital	H1	knowledge & skill	0.69	–
	H2	health & nutrition	0.71	9.45**
Physical capital	P1	Infrastructure	1.03	–
	P2	Transportation	0.74	9.93**
Social capital	S1	participation and membership	0.65	–
	S2	trust	0.50	6.18**
	S3	social network	0.58	6.93**
Financial capital	F1	economic opportunities	0.62	–
	F2	income	0.80	8.64**
	F3	production	0.73	8.30**

**P < 0.01%.

results into four levels are as follows:

A < MEAN – St. d	**A** = poor	**(1)**
MEAN – St. d < B < MEAN	**B** = moderate	**(2)**
MEAN < C < MEAN + St. d	**C** = good	**(3)**
MEAN + St. d < D	**D** = high	**(4)**

As seen in Table 4, the livelihood level of only 2.2% of the studied households was labeled poor. It reflects an improvement in the economic situation and livelihood of rural people over the past decades even is comparable with some developed areas of the country.

The Friedman test was used to compare the importance of each livelihood-related strategy among the households. The results indicated a significant difference among the six intended strategies (Sig = 0.000, Chi-square = 157.967). Regarding the average rank of income, its diversification and livelihood activities (4.24 from 5), and fishing income activities (2.48) are the most and the least important, respectively. Moreover, the results of focus group discussions showed that agriculture and livestock breeding were the main jobs of the people and their direct

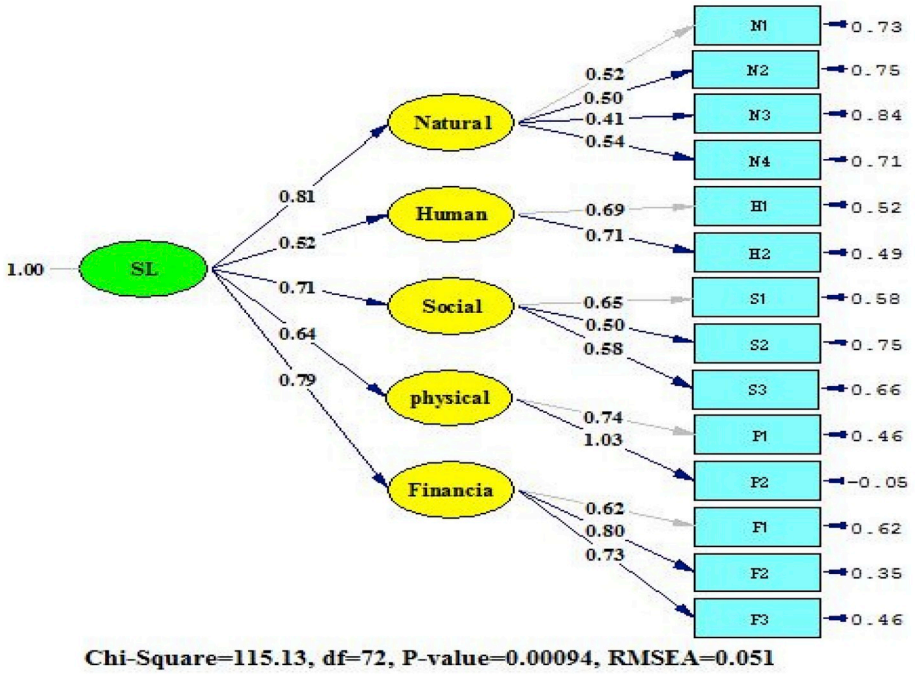

Fig. 3. Sustainable livelihoods model by displaying standardized load factors.

through a questionnaire in the form of a 5-point Likert scales[1] (Singh, 2006). Using Interval Standard Deviation from Mean (ISDM) method (Ahmadpour, Mokhtari, & Poursaeid, 2014; Sharifi, Nooripour, & Maryam Sharifzadeh, 2017) the livelihood level of rural households in the Zarivar wetland margin was classified. Accordingly, the factors that determine the level of livelihood from the perspective of individuals were prioritized based on mean, standard deviation and coefficient of variation, then the mean and standard deviation of the total were determined (113.68 and 33.64).according to the mean and standard deviation were set on different levels. In this way, how to convert the source of income and diverse small income resources from ecotourism. As a participant in FGD believed that "establishment of recreational centers and expansion of resorts in the region have created opportunities for indigenous people to engage in community service activities and increase our income". This means that with development activities related to the tourism industry, facilities for employment in hotels, restaurants and other related services such as construction work, road construction and infrastructures have been improved. Another participants stated that "the wetland indirectly creates opportunities for better sales and marketing of agricultural, food, livestock and handicrafts, other sectors of economic activity that are not directly related to the tourism industry" but it directly is related. That also indicated that use of t aquatic environment of the wetland for activities such as fishing and training on the water are other things that can be considered for recreation.

Since, they earned their highest income out of these jobs, they were so much dependent on them as well. In this area, farmers often planting wheat, barley, chickpea, alfalfa, clover, vegetables, chives, and tobacco in small pieces. Among irrigated products, wheat, clover and tobacco

[1] The Likert scale is a set of statements (items) offered for a real or hypothetical situation under study. Participants are asked to show their level of agreement (from strongly disagree to strongly agree) with the given statement (items) on a metric scale. This parameter was evaluated according to 1–5 score with 1 indicating very low, 2 indicating low, 3 indicating moderate, 4 indicating high and 5 indicating very much from the point of household livelihood level.

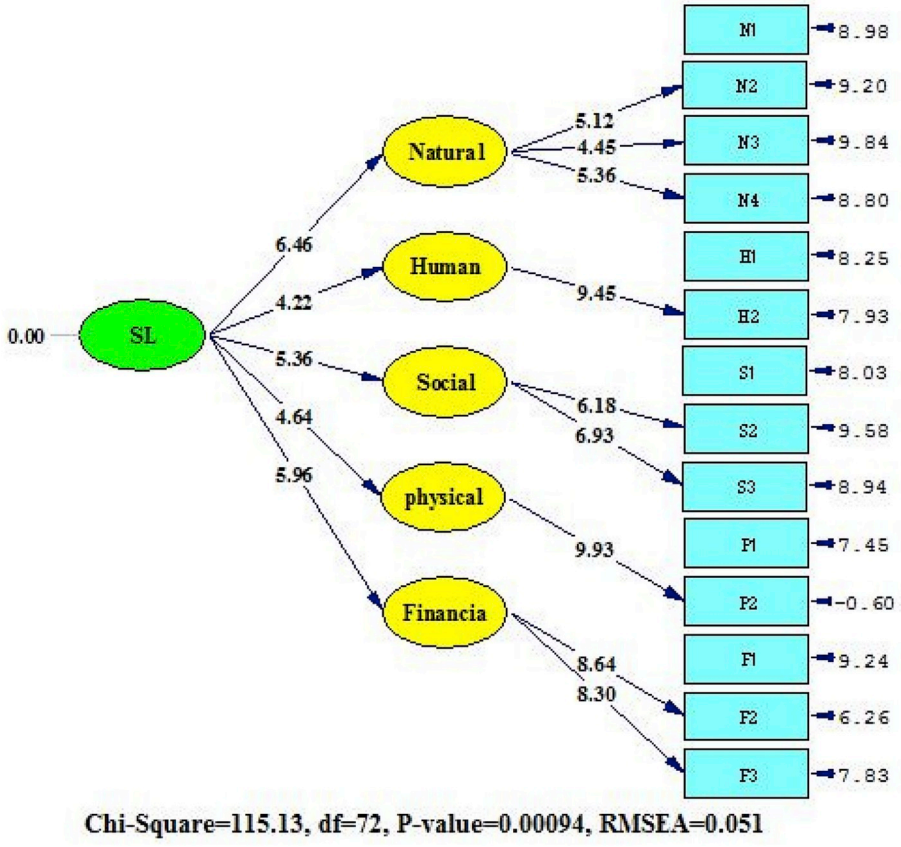

Fig. 4. Sustainable livelihoods model in significance terms.

Table 4
Frequency distribution of livelihoods among the rural households.

Range	Livelihood level	frequency	percent	Cumulative percent
<80.03	poor	5	2.2	2.2
113.68–80.03	moderate	82	35.7	37.8
147.33–113.69	good	136	59.1	97
>147.34	high	7	3	100
Total		230	100	–
Mean:113.68	SD:33.64	Minimum:71	Maximum:172	

products, barley and chickpea comprised the prevalent crop pattern.

4.4. Analysis of the correlation between the level of livelihood outcomes and the livelihood capital

Obviously, methods, types, extents and the intensity of human exploitation of local assets and the combination of them is the determinative factor of whether or not livelihoods are sustainable in the environment is a definite rural area, The results of the correlation test (Table 5) indicated that there was a positive and significant correlation between the natural capital generated by the wetland and the level of livelihood of the households. It seems that the people have used the wetland natural resources such as landscape for attracting external tourists, agricultural and non-agricultural activities to achieve their livelihood goals. Moreover, the human capital improved by the wetland which consequently increased the level of livelihood of rural households

Table 5
Correlation matrix of the livelihood capitals and the households livelihood levels.

Variable	Household livelihood outcomes (sum)	Household well-being	Household income	Food security	Reduced vulnerability	More sustainable use of natural resources
Natural capital	0.579	0.366	0.516	0.411	0.432	0.339
	0.000**	0.000**	0.000**	0.007**	0.023*	0.137
Human capital	0.523	0.458	0.595	0.432	0.504	0.299
	0.013*	0.059	0.030*	0.014*	0.041*	0.026*
Social capital	0.515	0.501	0.206	0.441	0.177	0.483
	0.018*	0.042*	0.112	0.028*	0.217	0.031*
Physical capital	0.526	0.361	0.162	0.372	0.478	0.172
	0.000**	0.000**	0.061	0.000**	0.022*	0.111
Financial capital	0.687	0.633	0.584	0.481	0.234	0.159
	0.004**	0.000**	0.000**	0.005**	0.027*	0.129

**P < 0.01%.
*P < 0.05%.

suggests that it can pursue livelihood strategies for achieving higher livelihoods for individuals. There was also a positive and significant relationship between the social capital created by the wetland and the level of household livelihood. The social capital is an asset through which individuals can access resources. In a village with the absence of social capital, existence of financial assets has no matter or proper security for operation and utilizing would not be possible properly.

Physical capitls are mainly human-made assets in rural environments that facilitate and accelerate operation and utilization of other existing assets. There was a positive and significant relationship between the amount of physical capital created by the wetland and the livelihoods of rural households. It can be said that the wetland help developing the basic infrastructure or the transport system of the villages. A positive and significant relationship between the amount of financial capital generated by the wetland and the level of livelihoods of the rural households shows that the potentials of tourism, agriculture, livestock, and fisheries has led to improved production and income, stability and sustainability. It has led to economic growth, better livelihood, and higher employment opportunities in the region.

Interviews also revealed that the people were relatively satisfied with the wetland outcomes due to the variety of jobs it had offered, and the expansion of facilities and infrastructure in the region. The wetland had created some new job opportunities particularly from tourism. This diversified income from the wetland resulted in a fair increase in the purchasing power of the households, as well as less price fluctuations leading to more economic sustainability. Facilities created in the region, including rural roads, agricultural and fishing infrastructures improved people's access to food.

In order to evaluate the total direct and indirect effects of the independent variables on the dependent variables, a path analysis method was used. According to the data, the five considered variables including natural capital, financial capital, human capital, social and physical capital seemed to have affected the level of livelihood of rural households in the wetland as dependent variable. On total, they directly explained 65.5% of the changes of the dependent variable (R = 0.814, R square = 0.662, Adjusted R Square = 0.655, F = 87.794, Sig = 0.000**). In this research, each of the independent variables is shown with xi (i = 1, 2, 3, 4, 5) and the dependent variable (the household livelihood level) is illustrated with **y**) X_1: Natural Capital, X_2: Financial Capital, X_3: Physical Capital, X_4: Social Capital, X_5: Human Capital).

The direct, indirect and total effects of independent variables on the dependent variable i.e. rural household livelihood level are shown in Fig. 5. As seen, the natural capital (0.492), financial capital (0.445), human capital (0.390), physical capital (0.360), and social capital (0.356) had the highest effects on the dependent variable, in that order. Considering the direct and indirect effects of the independent variables, the natural capital caused by the wetland had the greatest impact on the livelihoods of its households. The effect of low social capital on the other variables could indicate that social capital caused by the Zarivar wetland has not been able to provide favorable conditions for supporting income-producing activities and livelihood sustainability for their households at the desired level.

5. Conclusion

Wetlands have several effects in rural life and their livelihoods. In addition to agriculture economy and its relevant activities, ecotourism is nowadays accepted as a appropriate factor for sustaining rural livelihoods. This ecosystem globally seen as a basic natural assets or capitals which affecting human life and livelihood. In this study, Zarivar wetland assumed as an asset/capital which affecting local people's livelihood through tourism attraction and other benefits. Although most wetlands are thought to be a natural resource, it can actually lead to the development of other livelihood capitals. Undoubtedly, this capital can directly improve financial, social and human capitals. This is more significant in less developed regions with limited financial and economic capital. In particular, this capital can attract tourists and develop physical infrastructure and consequently attract investment and increase income and employment of local people.

The results of the confirmatory factor analysis in this study showed the selective markers' significance in measuring the level of all the five capitals of the households in the wetland area. Natural capital was the strongest capital for measuring the sustainability of the people which had a positive effect on their livelihoods. The potential of the wetland in

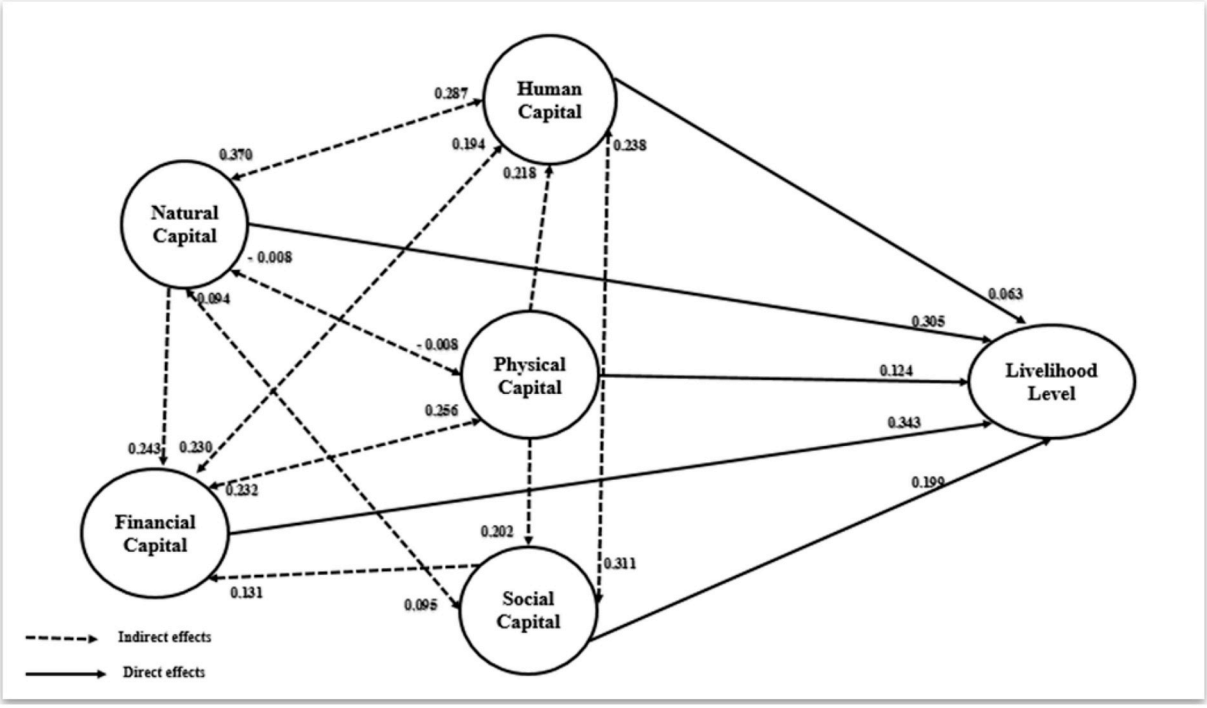

Fig. 5. An overview of effective variables on the household livelihood level based on the results of the path analysis.

agriculture and livestock, fisheries and tourism led to improved production and income, stability and sustainability of the economy; and caused livelihood and employment opportunities in the region. The wetland had expanded local social and cultural relations by developing and attracting tourism within the region. The arrival of national and international tourists as a result of communication and information and cultural exchanges led to both social and economic improvement of local people even agricultural and fishing cooperation in the villages. The wetland had somehow helped in turning a human resource into human capital with effective inputs of knowledge, health and social skill. The wetland also improved the physical capital of the region through helping to develop rural transport infrastructure, easier access to the market, developing recreational and tourism facilities, easier access to agricultural and fishing equipment, better household sanitation, and exerting a positive impact on the capacity to use the other household livelihood capitals.

Relevant literature emphasizes the of varied strategies for sustaining poor people livelihood. A significant difference in the importance of livelihood strategies among studied households was revealed in this study. It emphasized that the diversity of livelihood strategies were more important among the households. These results indicated that the basket of available household livelihood capital were effective in the peoples' livelihood strategies, and had created various income activities among households. An analysis of the results of group discussions showed that households had different strategies for responding to vulnerabilities. Selling, consuming and utilizing wetland goods and services, and improved assets were their most important protections against natural and economic shocks. This topic explains the high capacity of this natural phenomenon in the development of non-agricultural economies in the region as well. The wealth of poor households should be encouraged to engage in productive economic activities. Interestingly, households that possess a greater abundance of financial capital tend to involve in non-agricultural production as their primary livelihood strategy. One of the most important aspects affecting the sustainability of people's livelihood is their access to capitals that affect various aspects of the nature and amount of their livelihoods.

According to the results of the study, livelihood capitals in the region with the exception of human capital were higher than average, and evaluated to be desirable. But, according to participants' point of view, human capital indicated undesirable due to lack of relative improvement of education and poor educational facilities whereas financial capital due to economic opportunities and income (access to proper employment opportunities, favorable agricultural and livestock yields and diversification of rural economy) were desirable. Considering that education is part of the integrated wetland management process, however, as educational goals can go beyond mere focus on the wetland, it must be considered as a basic need by policy makers.

Therefore, improving household livelihoods requires recognizing the best and most cost-effective and, at the same time, the most sustainable ways to promote indigenous rural economies through local resources, government participation and government support. Changing the direction of development plans and priority of investments in these areas in order to create resources and opportunities for improving the ecological and social conditions are essential for achieving a sustainable livelihood level. Therefore, implementing a plan with a developmental and conservation strategy aimed at protecting the wetland is necessary. In this regard:

- Stronger and long term public-private partnerships needed with participation of local people in order to developing eco-tourism and conserving wetland resources, with the purpose of attracting tourists from both national and international level.
- Local people intervention in wetland conservation and tourism attraction activities is another important aspect in making tourism a successful program in this area
- Interested tourists may will revisit a natural area if the natural environment is fascinating and basic infrastructure have improved to meet their expectations. So it is essential to improve this possibilities to sustain tourism benefits.
- A nature tourism would be sustainable if financial resources are sufficient and resource management and conservation are also conscious active so it should be the most essential priority that the managers should consider.
- Tourism managers and policy makers in public sector need to recognize the limitations of partnerships, particularly in rural areas where destination marketing is insufficient for developing a robust ecotourism economy
- Finally, in planning a comprehensive management of wetland ecosystems as a ecotourism, special attention should appropriately be given to the "capacity of the board" to the agenda of regional planners, especially in wetland catchments.

CRediT authorship contribution statement

Mousa Aazami: Conceptualization, Methodology, Supervision, Writing - review & editing. **Karwan Shanazi:** Data curation, Writing - original draft, Visualization, Investigation, Software, Validation.

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