Perception, Knowledge, and Behavior towards Climate Change: A Survey among Agricultural Professionals in Hamadan Province, Iran

O. Jamshidi¹, A. Asadi¹*, Kh. Kalantari¹, and H. Azadi²

ABSTRACT

The purpose of this study was to evaluate perception towards climate change, level of knowledge and climate change related behavior of agricultural professionals in Hamadan Province, Iran. The statistical population of the study consisted of 360 agricultural professionals and, by using Cochran formula, sample size was determined as 121 people, who were chosen via a simple random sampling method. Data was gathered using a structured questionnaire whose face validity was confirmed through a panel of experts and its reliability was estimated using Cronbach Alpha coefficient (above 0.70). The results revealed that mean age of sample study was almost 45 years and more than half of them had MSc. and PhD. degrees. Also, results showed that 91.7% of the respondents had strong perception, and about half of the respondents had high knowledge of climate change. While a great majority (78.5%) of the respondents was willing to join the practical efforts to mitigate effects of climate change, about one-fourth indicated they were willing to sacrifice some individual benefit to solve existing problems. The results indicated a significant (P< 1%) difference between 3 major job groups, i.e. managers, faculty members, and experts, regarding climate change related behavior. Also, correlation analysis confirmed that education level, knowledge of climate change, and perception of climate change had a significant relation with climate change related behavior.

Keywords: Adaptation, Effects of climate change, Environmental issues, Individual characteristics, Public perception.

INTRODUCTION

Climate change has been recognized globally as an ever-increasing threat to our planet that is becoming impossible to ignore (Sarkar et al., 2012). Despite a few skeptical views (Dunlap, 2011), many researcher believed that climate change is one of the most important environmental issues facing the world today (Ekpoh and Ekpoh, 2011; FAO, 2012; Ayanwuyi et al., 2010; Parry et al., 2004; Wang, 2012; Karfakis et al., 2012; Arbuckle Jr et al., 2013; Brooks et al., 2009; Pishbahar, 2016). However, there exists a widespread claim by researcher that climate change is happening and is being driven by human activities, like the burning of fossil fuels, industrial pollution, deforestation, and land use changes (IPCC, 2014; Oreskes, 2004). Climate change poses wide-range impacts on earth and global ecosystems including increases in air and water temperatures (IPCC, 2007), impact on water resources (Pradhan et al., 2015), change in precipitation pattern (IPCC, 2014; Hardy, 2003), decrease in agricultural production (Viala, 2008; Pishbahar and Darparnian, 2016) and land productivity (Kumar et al., 2016), livelihood of rural communities (Aydogdu and Yenigün, 2016), sea
level rises (El-Beltagy and Madkour, 2012), reductions in snow cover, lagers, and permafrost (IPCC, 2007), and human health (Hardy, 2003; Patz et al., 2005). In different economic sectors, agriculture, upon which society depends for the food, feed, and fiber that enable sustainable livelihoods, is one of the most vulnerable sectors to shifts in climate (IPCC, 2014; Arbuckle Jr et al., 2013; Burton and May, 2004; Hardy, 2003; Apata et al., 2009; Ayanwuyi et al., 2010; Apata, 2011). Apata et al. (2009) argued that climate change is expected to influence crop and livestock production, hydrologic balances, input supplies and other components of agricultural systems. However, climate change-related threats to agriculture also represent threats to quality of life on a global scale (Arbuckle Jr et al., 2013) and have led to an increasing amount of attention to public awareness, perceptions, and behavior.

As mentioned earlier, there is different point of view about climate change and its impact, but to reach an agreement about severe climate impact, it is necessary to build a consensus among the general population and agricultural professionals. More specifically, policy actions to address climate change and global warming will have to account for public perceptions and must be understood and accepted in order to be politically feasible and successfully implemented (Lorenzoni and Pidgeon, 2006; Jamelske et al. 2013).

As Sarkar et al. (2012) mentioned, it is necessary to understand climatic change from the socio-economic perspective to prepare a road map for capacity building of people and to help the policymaker in formulating future policy based on human perception and attitude. Therefore, it is very crucial to investigate what people know, think, believe and behave across a spectrum of issues related to climate change (Jamelske et al. 2013). Although the study of perception of climate change as a threat across the world has been increasing over the years thanks to the severity and increased frequency of climate change impacts (Ochieng and Koske, 2013; Sarkar et al., 2012), it is not considered as a top priority global issue, especially in the developed countries (Leiserowitz et al., 2005) and very little research effort has been focused on this area (Arbuckle Jr et al., 2013), especially with regard to agricultural professionals. In this context, Burnett et al. (2014) believed that, although the general public perceptions of climate change are well documented, few studies focused specifically on the beliefs and perceptions of agriculture and natural resource professionals. However, there are considerable researches directed to study perception, attitude, awareness, and behavior about climate change based on surveys (Junni Wei et al., 2014; Fonta et al., 2015; Al Buloshi and Ramadan, 2015; Sahu and Mishra, 2013; Howlader, 2015; Apata et al., 2011; Ayanwuyi et al., 2010; Belachew and Zuberi, 2015; Debela et al., 2015; Kamruzzaman, 2015; Okonya et al., 2013; Mengistu, 2011; Sarkar et al., 2012; Al Buloshi and Ramadan-Franco and Haan, 2015; Ndaman and Watanabe, 2015; Fou-Mensah et al., 2012; Maponya and Mpandeli, 2013; Maddison, 2007; Skalik, 2015).

Global concern regarding the devastating impact of climate change has emphasized the need for creating awareness and building community capacity for adaptation strategies to mitigate the effects of climate change (Ekpoh and Ekpoh, 2011). In other hands, as Arbuckle Jr et al. (2013) argued, the farmers are critical decision makers who could effectively manage the agricultural lands and adapt to changing climate conditions, but these farmers also consider agricultural professionals of official organizations as a qualified reference group that provides them with technical information. Moreover, to date, the majority of existing studies examining farmers’ perception and knowledge of climate change (Niles et al., 2016) and a few research focused on professionals and experts perception (Rodriguez-Franco and Haan, 2015).

Attitudes and expectations play a significant role in society, development, environment, and resource economics (Aydogdu and Yenigün, 2016). As Dietz (2015) implied, attitudes can be strong predictors of behaviors or acceptance of ideas. In this regard, Howden et al. (2007) emphasized that if farmers do not believe that climate change is occurring and/or do not perceive it to be a threat to their livelihoods, they will not likely act to adapt to or mitigate climate change effects. This is also important to understand how the agricultural professionals’ perceive climate change and assess their knowledge level of climate change. A better
understanding of public perceptions, attitude and behavior in relation to climate change will provide an important foundation for government's policy-making, service provider's guideline development, and the engagement of local communities (Junni Wei et al., 2014). Agricultural professionals are an important group in the battle against effects of climate change and it is therefore crucial to understand their perception, attitude and behavior in relation to climate change. However, such information is still scarce and reported mainly in developed countries. So, the primary aim of the study was to investigate perception, knowledge and climate change related behavior among agricultural professionals in Hamadan Province, Iran.

**MATERIALS AND METHODS**

**Study Area**

This study was conducted in Hamadan Province, located in the west of Iran. Hamadan was chosen as the study site because of the climate change and its risks that confront the agriculture sector and farmers. Numerous researches have shown that this area has experienced climate change in recent years and it is anticipated that future climate is hotter and dryer. For example, IMO (2013) concluded that mean temperature of the area will increase by 0.5 to 0.8°C and annual precipitation will drop off about 23 mm in short period of time 2010-2039, compared with base period of 1976-2005. Similarly, Nazari et al. (2016) concluded that temperature would rise 1.12 to 2.12°C and rainfall would drop by almost 1.4-6.1 percent for the period 2045-2065. Amiri et al. (2015) mentioned significant increasing trend in mean temperature and Zare et al. (2011) implied that annual precipitation of the area declined while value of SPI index increased. As climate is changing in the area and agriculture is directly dependent on climatic conditions, with the limited capabilities and recourses, agriculture can be considered as one the most vulnerable sectors to climate change. (Figure 1).

The main purpose of this research was to investigate perception, knowledge, and behavior towards climate change in agricultural professionals. This research was descriptive and analytical survey and applied a self-developed structured questionnaire to collect information. The validity of the questionnaire, as shown in

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**Figure 1.** A general map of Iran illustrating the location of the study area.
Table 1, was ensured through the expert opinion and its reliability was confirmed by Alpha Cronbach over 0.7 for different scales of research.

The targeted study population was 360 agricultural professionals who were employed at Jihad-e- Agriculture Organization of Hamadan Province and Research and Education Center for Agriculture and Natural Resources of Hamadan. Sample size, determined by Cochran formula, was 121 people. The research survey questionnaire consisted of 4 main parts including section A (demographic information like gender, age, education, experience, etc.); section B (perception about climate change, which was measured by using a scale consisting of 11 items patterned on a five-point continuum ranging from strongly agree (5) to strongly disagree (1) for positive items and reverse for negative items); section C (15 yes, no or don’t know items to assess knowledge of climate change); and section D (6 questions to evaluate climate change related behavior). Data were gathered in 2016, and analyzed using SPSS statistical software version 18. Both descriptive and analytical statistics were applied.

### RESULTS

A total of 121 agriculture experts took part in this study and their personal characteristics are shown in Table 2. Based on the results, 85.1% of respondent were male and 14.9% were female. Mean age of the study sample was almost 45 years and 52.5% were aged 41-50 years old. In terms of education, more than half (53.7%) of the respondents had MSc. and PhD. degrees. Almost half of respondents had 21 to 35 years of job experience, with average of 19.88 years. 59.5% of respondents were expert, while 12.4% were manager, and 28.1% were faculty member.

Perception is the way of processing raw data that a person receives through his sensory organ from the environment into meaningful pattern. Human perception depends not only on individual personality but also on community, environment, and interaction among these components (Sarkar et al., 2012). Before taking any further action to adapt to climate change, at

### Table 1. Reliability analysis for different scales of research instrument.

<table>
<thead>
<tr>
<th>Dimension</th>
<th>Number of item</th>
<th>Cronbach's Alpha</th>
</tr>
</thead>
<tbody>
<tr>
<td>Perception</td>
<td>11</td>
<td>0.814</td>
</tr>
<tr>
<td>Knowledge</td>
<td>16</td>
<td>0.725</td>
</tr>
</tbody>
</table>

### Table 2. Personal characteristic of respondents.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Group</th>
<th>Frequency</th>
<th>Percent</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender</td>
<td>Male</td>
<td>103</td>
<td>85.1</td>
<td>Mode: male</td>
</tr>
<tr>
<td></td>
<td>Female</td>
<td>18</td>
<td>14.9</td>
<td></td>
</tr>
<tr>
<td></td>
<td>≤ 30</td>
<td>5</td>
<td>4.1</td>
<td>Maximum:62</td>
</tr>
<tr>
<td></td>
<td>31-40</td>
<td>21</td>
<td>17.4</td>
<td>Minimum:27</td>
</tr>
<tr>
<td></td>
<td>41-50</td>
<td>72</td>
<td>52.5</td>
<td>Mean:45.19</td>
</tr>
<tr>
<td></td>
<td>51-65</td>
<td>23</td>
<td>19</td>
<td>SD: 6.41</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Mode:48</td>
</tr>
<tr>
<td>Education level</td>
<td>Associate Degree</td>
<td>6</td>
<td>5</td>
<td>Mode: MSc.</td>
</tr>
<tr>
<td></td>
<td>MB</td>
<td>50</td>
<td>41.3</td>
<td>and PhD.</td>
</tr>
<tr>
<td></td>
<td>MSc. and Ph.D.</td>
<td>65</td>
<td>53.7</td>
<td></td>
</tr>
<tr>
<td>Job experience</td>
<td>0-10 years</td>
<td>17</td>
<td>14</td>
<td>Maximum: 32</td>
</tr>
<tr>
<td></td>
<td>11-20 years</td>
<td>42</td>
<td>34.7</td>
<td>Minimum: 2</td>
</tr>
<tr>
<td></td>
<td>21-35 years</td>
<td>62</td>
<td>51.2</td>
<td>Mean: 19.88</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>SD: 7.22</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Mode: 20</td>
</tr>
<tr>
<td>Job major</td>
<td>Experts</td>
<td>72</td>
<td>59.5</td>
<td>Mode: Expert</td>
</tr>
<tr>
<td></td>
<td>Manager</td>
<td>15</td>
<td>12.4</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Faculty member</td>
<td>34</td>
<td>28.1</td>
<td></td>
</tr>
</tbody>
</table>
first, we should assess the peoples’ perception about climate change. Result of Table 3 shows that majority of respondents (92.5%) in the study perceived that climate of the region is changing. According to 90% of the professionals, “snowfall in the region dropped compared to previous years” and 84% strongly agreed with the statement of “regional temperature is rising every year”. The mean score of statement “coldness increased in region over recent years” was rather low (2.63) and about 70% of respondents rejected that statement.

To assess agricultural professionals’ knowledge of climate change and variability, a scale with 15 climate change related questions was used. Then, the score of each respondent was calculated in the range of 0 to 30 (each correct response scored 2). To group the respondents, score 0 to 10 was considered as low knowledge, 11-20 as moderate knowledge, and 21-30 as high knowledge. From Table 4, about half of the respondents had high knowledge of climate change, 43.8% had moderate knowledge, while only 7.4% had low knowledge of climate change.

To simplify the data and summarize and categorize the items of climate change knowledge, factor analysis was utilized. The computations revealed that the internal coherence of the data was appropriate [Kaiser-Meyer-Olkin (KMO)= 0.703] and Bartlett's statistical data was significant at 99% confidence level. According to Eigen value more than one, there were 4 factors which explained 61% of total variance. Factor 1 explained 19.76% of the total variance; it was named “process knowledge”. Factor 2 explained 15.78%, factor 3, 12.94%, and factor 4 explained 12.58% of the...
Table 4. Frequency distribution of respondents, based on the level of climate change knowledge.

<table>
<thead>
<tr>
<th>Rank</th>
<th>Item</th>
<th>Frequency</th>
<th>Percentage</th>
<th>Cumulative Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Low knowledge</td>
<td>9</td>
<td>7.4</td>
<td>7.4</td>
</tr>
<tr>
<td>2</td>
<td>Moderate knowledge</td>
<td>53</td>
<td>43.8</td>
<td>51.2</td>
</tr>
<tr>
<td>3</td>
<td>High knowledge</td>
<td>59</td>
<td>48.8</td>
<td>100.0</td>
</tr>
<tr>
<td></td>
<td><strong>Total</strong></td>
<td><strong>121</strong></td>
<td><strong>100</strong></td>
<td><strong>-</strong></td>
</tr>
</tbody>
</table>

total variance; they were labeled as “terms knowledge”, “impact knowledge”, and “number knowledge”, respectively (Table 5).

In this section, to assess respondents’ climate change related behavior, a 5 items survey in different related categories was used, based on Junni Wei et al. (2014). Result showed that the majority of respondents (76.9%) believed that climate change could be avoided, but through great endeavors; while about one tenth indicated that climate change could not be avoided. While great majority (78.5%) of respondents were willing to join the practical efforts to mitigate climate change, about one fourth indicated they were willing to sacrifice some individual benefit to solve the existing problems. As a sample of climate change related behavior, 37.2% of participants used public transportation all the

Table 5. The component of knowledge towards climate change.

<table>
<thead>
<tr>
<th>Item</th>
<th>Knowledge component</th>
<th>Eigen values</th>
<th>% Variance</th>
</tr>
</thead>
<tbody>
<tr>
<td>The main reason for climate change was human activity such as burning fusil fuels, changing land use and... since 1750s</td>
<td>0.722</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Climate change is caused by imbalance in incoming and outgoing energy from the Earth's atmosphere due to increased greenhouse gas emissions.</td>
<td>0.624</td>
<td>2.76</td>
<td>19.768</td>
</tr>
<tr>
<td>Clouds and water vapor made the Earth's surface cooler.</td>
<td>0.842</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Climate, changes the same in everywhere</td>
<td>0.811</td>
<td>2.21</td>
<td>15.785</td>
</tr>
<tr>
<td>The more CO₂ in atmosphere, the more absorbance of heat and warmer earth</td>
<td>0.509</td>
<td>1.81</td>
<td>12.943</td>
</tr>
<tr>
<td>ChloroFluoroCarbons (CFCs) are the most serious threat to the ozone layer.</td>
<td>0.795</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Life on Earth could not exist without the protective shield of the ozone layer</td>
<td>0.657</td>
<td>2.11</td>
<td>15.785</td>
</tr>
<tr>
<td>Human activity is the main reason for climate change</td>
<td>0.836</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Conceptually, climate change is the same as climate variation</td>
<td>0.506</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Climate change by increased temperature and increased plant growth raise agricultural production.</td>
<td>0.512</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Global warming will increase the incidence of infectious and contagious diseases.</td>
<td>0.753</td>
<td>1.81</td>
<td>12.943</td>
</tr>
<tr>
<td>Destruction of tropical forests, will intensify global warming</td>
<td>0.684</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Climate change effects can be mitigated by cutting off GreenHouse Gases (GHG) emission</td>
<td>0.666</td>
<td></td>
<td></td>
</tr>
<tr>
<td>About 25% of GHG emission emitted from agriculture sector</td>
<td>0.774</td>
<td>1.76</td>
<td>12.585</td>
</tr>
<tr>
<td>CO₂ in the atmosphere has contributed the most to global warming</td>
<td>0.644</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Extraction method: Principal component analysis**

**Rotation method: Varimax with Kaiser normalization**

**KMO: 0.703**

**Bartlett's Test; 536.11**

**99% confidence level**

1374
Climate Change Perception, Knowledge, and Behavior

The results of the applied analysis of variance showed that there was no significant evidence of the effect of the studied major job groups concerning perception of climate change and knowledge towards climate change. However, the results indicated a significant difference between the 3 major job groups regarding climate change related behavior, at 99% confidence level in which the level of climate change-related behavior of faculty members was significantly more than the two groups of managers and experts. There was also a statistically significant difference between gender groups of female and male in some variables. In terms of perception, females’ score was statistically higher (95% confidence level), but in terms of climate change related behavior, males’ score was greater. In other words, gender does make a difference in the studied variables as women know more about climate change, but men take more action.

An overview of the intercorrelations of the variables used in this study is provided in Table 7. The level of education, knowledge toward climate change, and perception of climate change as the predictor variables are significantly correlated with other variables as shown in Table 7. The table also shows that age, education, and knowledge have a significant influence on perception and behavior.

### Table 6. Distribution of respondents according to their climate change relevant behavior.

<table>
<thead>
<tr>
<th>Climate change relevant behavior</th>
<th>Frequency</th>
<th>Percent (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Can climate change be avoided?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Absolutely possible</td>
<td>13</td>
<td>10.7</td>
</tr>
<tr>
<td>It’s possible but through great endeavor</td>
<td>93</td>
<td>76.9</td>
</tr>
<tr>
<td>Climate change cannot be avoided</td>
<td>11</td>
<td>9.1</td>
</tr>
<tr>
<td>Don’t know</td>
<td>4</td>
<td>3.3</td>
</tr>
<tr>
<td>If someone called for, would you like to join the practical efforts to mitigate climate change?</td>
<td>95</td>
<td>78.5</td>
</tr>
<tr>
<td>Yes</td>
<td>6</td>
<td>5.0</td>
</tr>
<tr>
<td>No</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Uncertainty</td>
<td>20</td>
<td>16.5</td>
</tr>
<tr>
<td>Are you willing to sacrifice some individual benefit to solve existing problems?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Very willing</td>
<td>31</td>
<td>25.6</td>
</tr>
<tr>
<td>Not very willing</td>
<td>86</td>
<td>71.1</td>
</tr>
<tr>
<td>Not at all</td>
<td>4</td>
<td>3.3</td>
</tr>
<tr>
<td>Do you usually use public transportation</td>
<td></td>
<td></td>
</tr>
<tr>
<td>All the time</td>
<td>45</td>
<td>37.2</td>
</tr>
<tr>
<td>Sometimes</td>
<td>38</td>
<td>31.4</td>
</tr>
<tr>
<td>Rarely</td>
<td>20</td>
<td>16.5</td>
</tr>
<tr>
<td>Not at all</td>
<td>18</td>
<td>14.9</td>
</tr>
<tr>
<td>Did you participate in some environmental protection activities related to climate change?</td>
<td>64</td>
<td>52.9</td>
</tr>
<tr>
<td>Yes</td>
<td></td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>57</td>
<td>47.1</td>
</tr>
</tbody>
</table>

### Table 7. Inter-correlations of studied variables.

<table>
<thead>
<tr>
<th></th>
<th>Age</th>
<th>Education</th>
<th>Knowledge</th>
<th>Information</th>
<th>Perception</th>
<th>Behavior</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>1</td>
<td>-0.005</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Education</td>
<td>-0.037&lt;sup&gt;NS&lt;/sup&gt;</td>
<td>0.239**</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Knowledge</td>
<td>-0.063&lt;sup&gt;NS&lt;/sup&gt;</td>
<td>0.133&lt;sup&gt;NS&lt;/sup&gt;</td>
<td>0.107&lt;sup&gt;NS&lt;/sup&gt;</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Information</td>
<td>-0.182*</td>
<td>0.004&lt;sup&gt;NS&lt;/sup&gt;</td>
<td>0.255**</td>
<td>0.181&lt;sup&gt;*&lt;/sup&gt;</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Perception</td>
<td>0.058&lt;sup&gt;NS&lt;/sup&gt;</td>
<td>0.238**</td>
<td>0.226*</td>
<td>0.085&lt;sup&gt;NS&lt;/sup&gt;</td>
<td>0.255**</td>
<td>1</td>
</tr>
</tbody>
</table>

* 95% confidence level; ** 99% confidence level, NS: Not Significance.
positively correlated with climate change behavior, ranging from 95 to 99% significant confidence level. Also, it is clear that there was no significant relation between climate change-related behavior and variables of age and climate change information seeking. However, perception of climate change was the most strongly correlated with climate change related behavior.

DISCUSSION

Climate change related variables such as perception, knowledge, and behavior are clearly complex and multidimensional. The purpose of this study was to provide wide and comprehensive of the some determinates that underline climate change related behavior. To this context, this study aimed to assess the perception of climate change, knowledge towards climate change, and climate change related behavior of agricultural professionals in Hamadan Province, Iran. Understanding the views, perception, and beliefs of the public on climate change will be very instrumental in the climate adaptation and mitigation process (Shome et al., 2009). Most studies on perception, knowledge or behavior on climate change focused on public (Leiserowitz et al., 2005; Lorenzoni and Pidgeon, 2006; Skalik, 2015; Dana et al., 2015; Patchen, 2006; Al Buloshi and Ramadan, 2015). Some focused on vulnerable communities (Kabir et al., 2016; Semenza et al., 2008), instructors (Nwosu and Ofili, 2016), health professionals (Junni Wei et al., 2014), students (Christensen and Knezek, 2015; Ochieng and Koske, 2013), extension agents (Ogunlade et al., 2014; Becerra et al., 2016; Burnett et al., 2014), environmental managers (Rodriguez-Franco and Haan, 2015) and lots of research has been done on farmers (Arbuckle Jr et al., 2013; Niles et al., 2016; Sarkar et al., 2012; Battiste, 2016; Apati, 2011; Ayanwuyi et al., 2010; Belachew and Zuberi, 2015; Fonta et al., 2015; Nwobodo and Agwu, 2015; Aydogdu and Yenigün, 2016). But, little research has been conducted concerning the perceptions, knowledge, or behavior of agricultural professionals.

In terms of perception, that is, the views and interpretations of the climate issue based on beliefs, experiences, and understanding (Wolf and Moser, 2011), the evidence from this study showed that most of the respondents had strong perception of climate change. It should be noticed that perception of climate change is clearly complex and multidimensional (van der Linden, 2015), so, in interpretation of result, some personal factors should be taking into account. Human perception depends not only on individual personality but also on community, environment, and interaction among these components (Sarkar et al., 2012). Another major point is that perception is a substantial determinant of behavior. For instance, Arbuckle Jr et al. (2013) found that perceptions of climate risk are central to farmers’ adaptation, while in Gandure et al. (2013), farmers have perceived increase in temperature, warmer summer temperatures, and colder winter temperatures. According to the results of this study, respondents believed that in the study region climate is changing; temperature is rising, while precipitation is decreasing. Also, respondents strongly believed that the snowfall in the region dropped compared to previous years. Similarly, Becerra et al. (2016) found that the majority of extension educators believed the climate was changing, and in research of Aydogdu and Yenigün (2016) conducted in Turkey, more than half of the studied farmers perceived climate change as a risk and they were more likely to take adaptation practices.

Another important personal variable studied was knowledge of climate change. The result showed that about half of the respondents had high knowledge of climate change. In consistent with Ogunlade et al. (2014) and Al Buloshi and Ramadan (2015), more than half of the respondents had excellent level of knowledge. But, different from our finding, in Nwobodo and Agwu (2015), only 6.5% of respondents who were farmers had high knowledge of climate change. But, in Rodriguez-Franco and Haan (2015), over 90% of respondents were well-informed about climate change. In Kabir et al. (2016) also, the knowledge level of the participants on climate change was more than the study assumption and almost half of the respondents had heard about it. It could be concluded that high level of respondents’ knowledge in this study was due to their high education level. Similarly, Aydogdu and
Yenigün (2016) found that when education level of farmers increases, there is an increase in risk perception of climate change.

As mentioned earlier, more than half of respondent had MSc. and PhD. degrees, which is not inconsistent with other studies farmers’ education. In using factor analysis, it turned out that four knowledge components, namely, process, terms, impact, and number explained more than 60% of total variance. Similarly, in Skalik (2015), four factors called document, processes, terms, and numbers were extracted as the components of climate change-related knowledge.

Regarding climate change related behavior, great majority of respondents were inclined to join the practical efforts to mitigate climate change effects, while about one fourth indicated they were inclined to sacrifice some individual benefit to solve the existing problems. In the study by Al Buloshi and Ramadan (2015), more than nine tenth of respondents declared readiness to contribute to reduce the causes of this phenomenon, and in the study of Junni Wei et al. (2014) the majority of respondents were willing to change their behavior. While in Burnett et al. (2014) only fifteen percent of respondents reported they had previously participated in climate programs. However, in current study, about one third of respondents used public transportation all the time and about half of them had participated in some environmental protection activities related to climate change.

The results of the comparative analysis showed significant differences between the three major job groups in terms of climate change related behavior. Faculty members’ behavior was assessed more environmentally friendly and there was no significant difference about the perception, knowledge, and information seeking. Similarly, in the work of Rodriguez-Franco and Haan (2015), there was no significant difference between professional groups in terms of expected climate change and source of information.

Based on our findings, it is clear that females’ climate change perception and information seeking was higher than males, but in terms of climate change related behavior, males’ score was greater than females’ score. Similar observation has been reported in McCright (2010) study, where women were more concerned about environmental issues than men. Also, Junni Wei et al. (2014) indicated that female staff were more likely to access climate change information through the internet. Contrary to the findings of this research, Dana et al. (2015) found that, in Dhaka, males were significantly more knowledgeable compared to females, and in Kisauzi et al. (2012) women’s knowledge was lower than men. Women and men have dissimilar attitudes, interests and preferences, which lead to environmental risk perception and predict behavioral responses (Bord et al., 1997). McCright (2010) suggested that gender differences may stem from differing socialization experiences between men and women, which can lead to differing levels of environmental concern. However, understanding gender dimensions of climate change perceptions, knowledge, and behavior contributes to effective climate change adaptation planning. Consequently, climate change response interventions need to engage both men and women, but it seems that more favorable conditions for agricultural professional women’s decision-making are needed. Given the social and cultural conditions of the region, this group can make better relationship with the vulnerable rural women and improve their adaptive capacity.

The result of intercorrelations of the variables confirmed that behavior is related to education, knowledge, and perception. Results of some other studies are in agreement; for instance, Kabir et al. (2016) found that education was significantly associated with climate change knowledge. In the work of Niles et al. (2016), perception was correlated with climate change belief and future climate concerns and risks. In Tsitsoni and Toma (2013) study, some demographic factors were the main determinants of environmental behavior; also, environmental attitudes and perceptions had a significant impact on behavior. Niles et al. (2016) concluded that farmers who had a favorable perception of environmental regulations were positively associated with adaptation behaviors, and Jiri et al. (2015) found that perceptions of climate change have a positive effect on adaptation strategies, which is a kind of climate change related behavior. In addition, our finding was consistent with existing studies where farmers
with climate belief and risk perceptions were more likely to adopt mitigation and adaptation behaviors (Niles et al., 2016; Arbuckle Jr et al., 2013; Haden et al., 2012). The finding proves that education, access to information, and perception matter and determine climate change related behavior. As Tsitsoni and Toma (2013) mentioned “The more we know about the world we live in, the more likely we are to care about it and the more motivated we can be in order to protect it”.

CONCLUSIONS

Climate change and its risk are global concern (Al Buloshi and Ramadan, 2015) but, due to different social context, the way in which communities and individual perceive it, the level of knowledge, and how they behave in facing with this phenomenon are different. In this regard, Niles et al. (2016) stated “The ways that individuals perceive climate change is highly personal, place-based, and influenced by a number of factors”. Although some studies have investigated perception, knowledge, and behavior of agricultural professionals towards climate change, but researches usually focus on farmers. Thus, in this study, we assessed how agricultural professionals perceive climate change, how much is their knowledge of climate change, and how they behave toward climate change.

The result showed that agricultural professionals’ perceive climate change clearly and are concerned about its impact on, specially, agriculture sector in Hamadan Province, Iran. Noticeable proportion of respondent acted environmentally friendly as their behavior related to climate change, but it can be even better. Another important point is that agricultural professionals, due to contact with the various population groups, especially those at the grass roots, can make significant contributions to improve public awareness of climate change issues by making it a priority issue when they teach, speak, and conduct research. As Ochieng and Koske (2013) stated, “Increasing people’s awareness on climate change through education is an important measure to persuade people at all levels in the community to play an active role in mitigating and adapting to climate change” and agricultural professionals can participate in such activity as well.

The study showed that agricultural professionals have a widespread knowledge of climate change and its impact, so, they should be part of climate change adaptation and mitigation planning in the region. But still, it is recommended that agricultural professionals should be trained and re-trained in information and knowledge acquisition in order to further enhance their knowledge of climate change impact and adaptation strategies.

Finally, although a number of best practices in conducting research were employed in this study, some limitations must be addressed. First, the response rate obtained in this study was almost ideal, but some respondents did not fill up the questionnaire carefully. Second, as this study was conducted at the divisional level and focused only on agricultural professionals, it may not represent the perceptions of elsewhere, thus some consideration should be taken into account.

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تفاوت معتدلی و ادراک آبادی در طبقه‌بندی مطالعه مربوط به تغییر اقلیم در استان همدان ایران،

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چیزه

هدف مطالعه حاضر ارزیابی وضعیت ادراکی دانش و رفتن مرتب تغییر اقلیم در بین متخصصان کشاورزی استان همدان بود. جامعه آماری تحقیق حاضر شامل 370 کارشناس خبره کشاورزی بود که با استفاده از فرمول کوکران حجم نمونه 121 نفر تعین و داده‌ها از روش نمونه‌گیری کاملاً تصادفی از آنها جمع آوری گردیدند. ابزار اصلی تحقیق پرسشنامه ساختاری بود که رویایی ظاهری آن با پنل متخصصین و بازیابی آن با ضریب آلفای کرونباخ بالاتر از 0/7 برای مقیاس‌های مختلف آن، مورد تایید قرار گرفت. نتایج نشان داد که میانگین سن نمونه مورد مطالعه 45 سال بود و بیش از نیمی از آنها دارای مدرک کارشناسی ارشد و دکتری بودند. همچنین نتایج حاکی از این بود که 91/7% از پاسخگویان دارای ادراک قوتی و حدود نیمی از آنها دانش بالایی از تغییر اقلیم داشتند. در حالیکه 9/85% از پاسخگویان مایل به پیوستن برای اقدام عملی در خصوص مقابله با تغییر اقلیم بودند، حدود یک چهارم حاضر بودند در راه حل این مشکل از منابع شخصی خود هزینه کنند. نتایج نشان داد به سه گروه اصلی شغلی مدیران، اعضای هیات علمی و کارشناسان در خصوص رفتار مرتب با تغییر اقلیم تفاوت معنی‌داری داشتند. درصد وجود دارند. همچنین نتایج نشان داد که نسبت به دانش تغییر اقلیم و ادراک آن ارتباط مستقیم معنی‌داری با پروز رفتارهای مرتبط با تغییر اقلیم دارد.