



Addressing Barriers of Rural Development under Drought

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Abstract

Purpose - Several models of rural development have been proposed but they have failed to adequately explain why development stagnates in certain regions. To fill this knowledge gap, this qualitative research was conducted.

Design/methodology/approach- Based on focus group interviews with farmers and semi-structured interviews with rural managers and experts from two sub-counties in Kherameh, Fars province, the barriers of rural development under drought were investigated.

Finding- Various adaptation strategies, such as changing cropping pattern, developing greenhouses and rising mushroom, quail and ostrich, have been applied by farmers in order to reduce the negative impacts of drought and water scarcity. However, different barriers including climate variability, quantitative and qualitative reduction of water resources, unemployment and lack of sustainable job opportunities, limitation of financial resources and investment, inefficiency of institutional supporting policies, limitation of budgets and loans, and uncertainty about future of agriculture have prevented rural areas from development.

Practical implications - Continuous monitoring of drought and developing early warning systems, consensus about distribution of common water resources, water conveyance from other regions and considering water subsidies, local participation in development planning, encouraging research institutes to focus their research on investigating and producing water resistance crops, improving drought management information through effective extension services and linking urban-based businesses with small-scale crop producers are offered to improve rural development in this drought prone area.

Originality/value- Given that a similar study has not been conducted about rural development traps under drought, the findings of this study can be used by rural development planners and practitioners.

Key words: Barriers of rural development, drought, construction of dam, rural families, drought management, Fars.

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1. Introduction

Rural areas perform multiple functions including production of food and raw materials, landscape conservation, creating employment opportunities and reinforcement of non-oil-producing economy in developing countries (Karim, Safdari Nahad, & Amjadipour, 2014; Keshavarz, Malek Saeidi, & Karami, 2017). Therefore, reduction of spatial disparities and achieving rural development are imperative in rural areas. However, development is inherently risky (Anderson, 2003) and despite the efforts made to improve physical, economic, social and cultural indicators (Varmarziari, 2016), there are still many uncertainties in rural development of Iran. While rural areas are keys to achieving economic growth and development (Keshavarz, Malek Saeidi, & Karami, 2017), increased occurrence of severe and long-lasting droughts, such as the 2007 to 2011 drought, and anthropogenic forces have significantly reduced productivity of agriculture and have led to increased water stress and food insecurity. Several studies have focused on environmental and socio-economic impacts of drought on natural resources and livelihood vulnerability of rural families (e.g., Adeli, Moradi, & Keshavarz, 2015; Keshavarz & Karami, 2016b; Keshavarz, Karami, & Lahsaeizadeh, 2013; Keshavarz, Karami, & Vanclay, 2013; Maleki, Zarafshani, & Keshavarz, 2014) and a large body of literature has already documented adaptation of local farmers to drought (e.g. Keshavarz, Karami, & Zibaie, 2014; Keshavarz & Karami, 2013). However, many adaptation efforts have not been successful enough in mitigating drought impacts and have led to destruction of natural resources and rural livelihoods (Keshavarz & Karami, 2016a; Keshavarz, Karami, & Kamgare-Haghighi, 2010). Several models of rural development have been proposed but they have failed to adequately explain why development stagnates in certain rural areas (Mikulcak, Haider, Abson, Newig, & Fischer, 2015). Insufficient use of ecological, cultural and social capacities of rural regions and improper planning for rural development under drought conditions have caused uncontrollable increase of poverty, unemployment and migration in some drought prone areas. In order to achieve sustainable and dynamic rural development, investigating rural development barriers under severe-sustained

droughts is of great importance. While the current rate of drought in arid and semi-arid regions is unprecedented, climate change is expected to increase frequency and intensity of droughts, put further pressure on natural resources and increase vulnerability of rural families, who principally depend on agriculture (IPCC, 2014). Therefore, it is necessary to insure that farm families increase their resilience to climate variability (i.e. drought) and change (Keshavarz & Karami, 2016a). To the best of our knowledge, few studies have addressed barriers of rural development and little is known about the barriers of achieving rural development in drought-prone areas of Iran. To fill this knowledge gap, this research was conducted.

2. Research Theoretical Literature

2.1. Definition and Characteristics of Rural Areas

Operational definition of rural area is crucial if policies are aimed to raise standards of living for rural inhabitants. It is widely acknowledged that rural is a fuzzy and complex concept, which is 'contested in terms of identifying the critical parameters of rural space' (Woods, 2011). However, rural area, by definition, consists of relatively small and geographically dispersed settlements (Kalantari, 2007). Also, rural area is intrinsically associated with low level of physical infrastructure. These characteristics that are typically related to rural places have caused inadequate use of natural, economic and social capacities of rural areas in development efforts (Naeimi & Sedighi, 2013).

2.2. Rural Development

A comprehensive definition of rural development is missing (Van der Ploeg, Renting, Brunori, Knickel, Mannion, Marsden, Roest, Sevilla-Guzman, & Ventura, 2000). However, rural development is generally considered as a sustained and sustainable process of economic, social, cultural and environmental change that is planned to enhance long-term well-being of rural communities (Moseley, 2003). Common features of this type of development include strong concentration on poverty eradication, facilitating inclusive economic growth, contributing to a more equitable distribution of income and paying more attention to poor rural people, focusing on

sustainable livelihood and strengthening integration among various economic activities and promoting local governance through decentralization and participation.

2.3. Models of Rural Development

Several models of rural development have been proposed, such as agrarian or farm-centric model, exogenous model, endogenous model and neo-endogenous approach. Agrarian model focuses on agriculture as the essence of rural development and tries to improve agricultural productivity. The exogenous model considers urban areas as the main drivers of rural development and seeks to attract external capital to rural areas (Hubbard & Gorton, 2011). In contrary, the endogenous model suggests that rural development strategies should focus on providing local natural resources or cultural values. This view ignores questioning power and agency, as well as the effects of a wider economy on local markets (Ward, Atterton, Kim, Lowe, Phillipson, & Thompson, 2005). Finally, the neo-endogenous approach recognizes interdependence of local resources and external factors (Mikulcak, Haider, Abson, Newig, & Fischer, 2015). This view underlines importance of building local institutional capacity and focusing on local needs.

3. Research Methodology

In order to investigate barriers of rural development under prolonged and severe sustained droughts, qualitative research method was used as an overarching research strategy. This research was conducted in Fars Province, Iran. Fars is one of the leading regions in agriculture and has ranked first in wheat production. This province has experienced several severe droughts in the last decade. As a result of long-lasting droughts, Fars has confronted groundwater degradation and water scarcity in most of its rural areas. The recent drought especially influenced farming systems that relied mainly on surface water resources, such as rivers, springs and lakes. Kherameh County is one of the regions that is severely affected by drought. Kherameh is located in east of Fars Province with 1593 km² land area. Average annual precipitation in Kherameh is 251.4 mm. About 44% of the total areas of this county are classified as irrigated farm lands. Kherameh has experienced 14 meteorological droughts between 1970 and 2015 including the 1972-1973 (88 mm) and 2007-2008

(87.5 mm) severe droughts. Furthermore, this county has suffered from nine continuous years of hydrological drought (i.e. the 2007-2016 drought), which significantly depleted water resources and reduced production of crops in this region (Bazrafkan, 2015).

Due to severity of drought impacts on this county, Kherameh was selected as the study area. Initial field observation was conducted and also four staff members from Kherameh Jihad- Keshavarzi organization were consulted to nominate sub-counties and villages that had suffered greatly from the current drought. Ultimately, two sub-counties and eight villages were selected for this research. Names of the villages are not revealed for ethical reasons.

The required data was collected during 2016 and 2017 in three subsequent steps including a series of 1) focus group interviews with farmers of eight water scarce villages, 2) in-depth semi-structured interviews with rural managers, and 3) in-depth interviews with experts of Jihad-Keshavarzi organization, Rural Cooperation and Water Management organization. In the first set of the interviews, purposive sample of five to seven farmers from each of the eight villages were interviewed. Interviews lasted about 90 to 120 minutes. Second round of the interviews was undertaken with five dignitaries, seven chairmen of village councils and one member of district council. These interviews continued about 45 to 75 minutes. Third round of the interviews was conducted with six experts of agriculture and water management.

Colaizzi's (Shosha, 2012) strategy of descriptive phenomenological data analysis was used to elicit an exhaustive description about rural development traps under drought. To this end, a number of significant statements and theme clusters were integrated to formulate the overall themes, which can describe the phenomenon thoroughly. Also, a thematic network diagram was designed by the key farmers, managers and experts to explain how the identified barriers are interrelated with each other. In order to enhance validity of this research, triangulation of the data resources (i.e. farmers, rural managers and experts) and respondent verification were adopted. Also, refutational analysis and constant data comparison were used to enhance reliability of the findings.

4. Research Findings

4.1. Farmers and Institutional Responses to Drought and Water Crisis

As presented in [Figure 1](#), in the past 30 years, various programs and interventions have been designed and implemented to manage drought and ensure rural development. However, the natural and economic constraints that are imposed by droughts have limited development efforts in this drought-prone area. As demonstrated in [Figure 1](#), Kherameh County has experienced its most prolonged and severe drought from 2007 to 2016, over the last 30 years. Although this region has a history of drought (5 drought incidences over the last three decades; [Figure 1](#)), critical characteristics of the current drought are not only its intensity and continuation but, also, the fact that impacts of the recent drought have been amplified by its proximity to the previous droughts (e.g. 1999-2001 and 1996-1997). Consequently, farmers have lacked the opportunity to recover and therefore, have been severely influenced by the recent drought. While drought, as a harsh reality, has imposed immense damages to natural water resources, construction and exploitation of two dams (i.e. Sivand and Molasadra) in an embattled watershed have negatively affected agricultural production in this area. With dams' exploitation, the water levels and volumes in the natural water resources have reduced to series of diminishing pools. With drought progression, some potable water bodies have dried up and saltwater has percolated to other drinking water resources. Since rural inhabitants have faced critical shortages of safe drinking water, the local government delivered water through tankers from 2011 to 2015. In 2015, water desalination devices were installed in central village of each sub-county and rural families have to purchase potable water. In summary, drought and anthropogenic interventions (i.e. construction of dams) have posed major effects on quantity and quality of water resources and agricultural productivity and are associated with economic, social and cultural implications.

[Figure 1](#) reveals that the local government has developed very diverse strategies, such as prohibiting rice and sugar beet cultivation, developing agricultural machinery, increasing insurance coverage and promoting cropping pattern change (e.g. rising mushroom and Safflower) to assist the rural farmers in adapting to

drought. However, the current water crisis has presented unexpected challenges.

Also, various adaptation strategies have been applied by the farmers in order to reduce the negative impacts of drought and water scarcity ([Figure 1](#)). According to [Figure 1](#), prior to the 2007 to 2016 drought, majority of the farmers have established few coping strategies, such as reduction of cultivation area and agricultural mechanization, and were not motivated to change their cropping patterns (e.g. converting farmlands to gardens). When water discharge from the surface water supplies was reduced and water crisis increased, farmers expanded their coping strategies in an intensifying manner. During this stage, several strategies including reducing cultivation area, applying less fertilizers, avoiding cultivation of rice and sugar beet, purchasing extra water, developing animal husbandry, purchasing crop insurance, off-farm occupation and rural to urban migration were adopted by the farm families. Moreover, some farmers had to invest a large amount of capital to develop greenhouses (12 units with areas ranging from 30 to 200 m²) or rise mushroom (65 units with areas ranging from 30 to 150 m²), quail (three units with approximately 2500 head) and ostrich (three farms with 80 head), in order to cope with the increasing water scarcity. As the current drought prolonged, the surface water supplies kept declining. In addition to surface water shortage, unequitable distribution of water by the government made the farmers more vulnerable to the increasing water crisis. As a result, changing cropping pattern by planting safflower (about 1200 hectares) or medicinal plants was considered, again. The results indicated that though drought has significantly reduced agricultural productivity, all institutional adaptation efforts have still focused on the agriculture sector

4.2. Barriers to Rural Development

Farmers, managers and experts' perception of rural development traps are summarized in [Table 1](#). As indicated in [Table 1](#), climate variability and change is one of the major barriers that has prevented this area from development. Livelihoods of the majority of rural families depend principally on agriculture in this study area. However, agriculture is inherently sensitive to the risks and impacts of climate variability and change. According to

Figure 1, during the last three decades, droughts have become more common in this region. Also, the current prolonged and severe-sustained drought has caused considerable negative environmental impacts (i.e. reduction of water resources) on this area. This intensified drought has reduced agricultural productivity and, also, it has increased livelihood vulnerability of farm families.

Meanwhile, climate change has led to a great temporal precipitation variability in the region. While about 60% of the annual precipitation has fallen between December and February in the last six years, rainfall rate has increased between March and April. Changes in precipitation pattern has had significant impacts on crop yield and crops' water requirement.

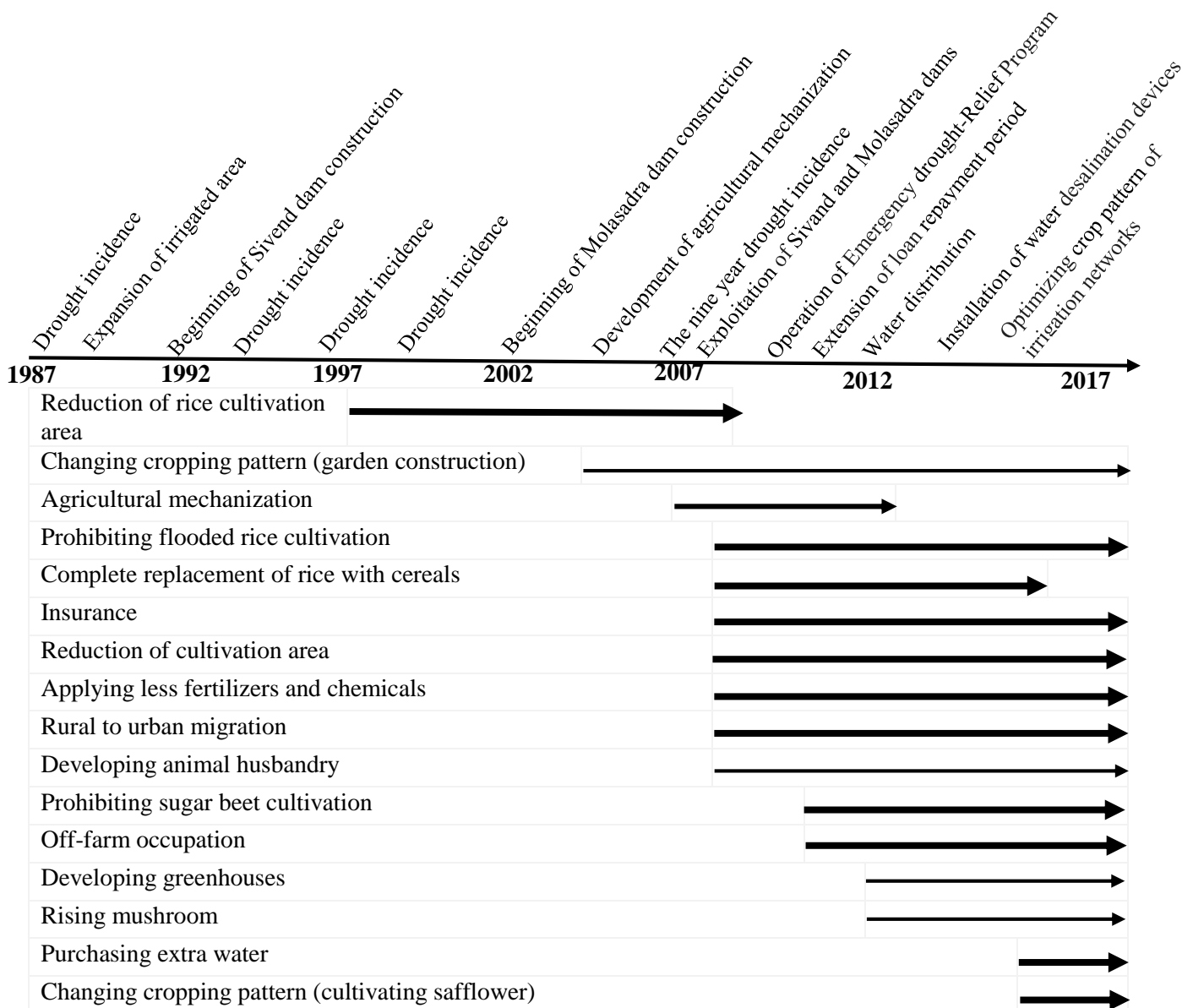


Figure 1. Evolution of strategies to deal with drought and water crisis

Source: Research findings, 2017

Table 1. Barriers of development in the study area from the farmers' (•), rural managers' (❖) and experts' (✓) viewpoints
 Source: Research findings, 2017

Themes	Meanings	Significant statements
Climate variability	Continuation of severe-sustained drought	<ul style="list-style-type: none"> • Other regions are experiencing drought and water shortage but, in this region, we are confronting extreme water crisis. We have no drop of water! ❖ Iran has 80 million populations and many regions have suffered greatly form drought. Who should the government care for? Unless God help us and the drought be resolved. ✓ Long-term drought has greatly affected the agriculture sector, in this region. The amount of damages is very high in agriculture and livestock production sectors.
	Changes in precipitation pattern	<ul style="list-style-type: none"> • It is not clear when the weather is rainy! We cultivated safflower carefully and did everything exactly but it rained late and no seed grew, at all. ✓ Last year, from January to March, which was previously our wet season, we didn't have any precipitation. In the Nowruz, the rainfall was only 10 mm! Is it enough for irrigation? Not at all! We need at least 30 mm of rainfall for each irrigation.
Quantitative and qualitative reduction of water resources	Dam construction	<ul style="list-style-type: none"> • In the last decades, engineers were informed about the advantages of dam construction. But, they never constructed dams like Molasarda and Sivand to prevent water supply disruption. Currently, dams are built after another! Nothing is right, now. ❖ When there was no dam, a little amount of water was received from Sivand and a low amount of water was released from Kor river. The water volume was low but our canal was never dry. Since Sivand dam construction, we have no water. ✓ Complete dry up of the river was a great shock! Construction of Sivand and Molasadra dams has encountered the region to water crisis. I don't know anything about technical aspects and feasibility of exploring these dams but these dams have seriously affected the region.
	Water scarcity and prohibition of digging well	<ul style="list-style-type: none"> • Digging a well is not a good solution in this region. Some farmers dug a borehole with 30 m depth but agents of water organization filled the wells. ❖ Farmers of other regions have access to groundwater. In the pessimistic view, when the ground water is depleting they can develop their own greenhouses. We have only access to surface water and this water is completely dried up. Water scarcity is our great problem. ✓ In this region, digging well is prohibited. The soil is alluvial. Natural constraints have limited development.
	Unequitable distribution of water	<ul style="list-style-type: none"> • If there is drought and water limitation, it should be for all regions [e.g. neighboring regions]. There is no matter if they cultivate crops for two years but if there be equity, we would be able to cultivate for one year. How do they cultivate rice each year and we cultivate nothing? The authorities should direct them to wheat cultivation like us if there is a justice! ❖ Our great problem is water mismanagement. We have never found a manager to tell us that this is your turn, now. This is your right to cultivate crops. We know that water is depleting but you can deliver water by tanker to 20 people or only to 2 people. When everyone is thirsty, more equitable distribution is needed. ✓ Rural residents of this region have water right and, historically, Kor river belongs to this area. However, they dug well in the neighboring city and no water was released for this people.
	Unsustainable and inadequate distribution of water	<ul style="list-style-type: none"> • Two or three years ago, we received a little amount of water from Doroodzan dam. It was good for wheat cultivation. Now, they cut out this water flow. Last year the canal was opened only once from 9 AM to 12 PM. We are 84 common water users. Nobody caught the released water. ❖ Last year, the water was delivered only for 24 hours. Everyone near the canal irrigated about one hectare, the ones that were more distant didn't receive any water. ✓ Timing for water distribution isn't clear. That's why it's impossible to plan and advice the farmers. It would be easier for farmers to decide about cropping pattern and cultivation area if the authorities clearly define the water distribution schedule.

Table 1.

Themes	Meanings	Significant statements
	Water delivering at an inappropriate time	<ul style="list-style-type: none"> The authorities tell us cultivate low water requirement crops. Then, we'll release water for irrigation. It's exactly right. They deliver water but in a bad time, when it's too late. ❖ They released water in 2017 but it was never used. They dumped the water. They delivered it in Nowruz!
	Low quality of water	<ul style="list-style-type: none"> The quality of water is low. If you dig a borehole, it'll be salty. ✓ Electrical conductivity (EC) is high in this region and quality of water is very low. If someone wants to develop greenhouse, he has to purchase a water tanker for 100 thousand Toman.
	Potable water shortage	<ul style="list-style-type: none"> The government has delivered water through tankers, in the last years. Local authorities deprived us from it. Now, they've installed water desalination devices in center of the village and get 300 Toman for 20 liters of water. ❖ Our drinking water is polluted. We provide our potable water from Kherameh city or buy desalinated water from the village's station.
Lack of drought monitoring	Poor drought monitoring systems	<ul style="list-style-type: none"> ✓ In my opinion, the scientific community and government should be blamed. If an accurate drought monitoring was done and early warning was developed, the crisis wouldn't be so severe.
	Limited control over water use	<ul style="list-style-type: none"> It is 10 years that water has depleted and downstream farms haven't received any water for irrigation. The farmers, whose farms are close to the mainstream canal, exploit limited water using a pump or tractor and nothing has remained for us. There's no supervision and we have nothing to give up.
Limitation of financial resources and investment	Poverty and low level of income	<ul style="list-style-type: none"> In this region, you should cry for alive persons not dead men. Everyone is very poor. We don't have any money to spend for education of our children in university. ❖ In this region, some people have very little money. Their incomes are only adequate for purchasing a bread! Some people manage their livelihoods only with governmental subsidies. If they don't receive these subsidies, they'll die. ✓ People in this area are very hard working. They do anything to improve their livelihoods but they don't have enough access to financial resources. Their incomes are very low.
	Inability to pay off previous loans	<ul style="list-style-type: none"> I benefited from a government loan but I'm disable to pay it off. Bank called the guarantor, 7 or 8 days ago. He told me that why don't you pay off your loan? It's not only my problem. No one can pay it back. ❖ Most residents of this village are indebted to the bank. No crop is raised. There's no water. It's not possible to pay back the loans. Bank has blocked their accounts and subsidies. ✓ Last year we introduced about 150 people to the bank. The bank didn't lend to them. Bankers told us that they are indebted and haven't pay off their previous loans.
	Increase of production costs	<ul style="list-style-type: none"> We don't have enough products and we're obliged to purchase forage. We should buy forage from Jahrom or Ghir & Karzain. The transport cost is three times more than forage cost. ❖ I have managed a dairy farm since 2006. When I started this business, I owned 7 cows. Now, I sold some of my cows because the forage is too expensive. ✓ It is unexpected! We can't sell our forage till now [the manager of rural cooperation]. Production costs are very high and livestock producers can't purchase forage. Last year we couldn't sell any forage. This year we sold only half of our reservoir.
	Cost-effectiveness of small-scale production	<ul style="list-style-type: none"> Isfahan's mushroom is cheaper than our products. So, no one buys our mushroom. Because we raise mushroom in 60 m² area but the Isfahanian units are large-scale. They produce compost in their units and consume it but we can't. It's all a shame. ❖ Farmers in this region raise mushroom in units with 70 m² area. Elsewhere, mushroom is produced in 1000 m² area, at least. It is obvious that our farmers' incomes are very low.

Table 1.

Themes	Meanings	Significant statements
	Cost-effectiveness of small-scale production	<ul style="list-style-type: none"> ✓ Farmers don't have the permission to dig a well. They should purchase water for irrigation of greenhouse products. The cost of one-kilogram cucumber that is produced in their greenhouses is almost 500 Toman. The total cost for D.' [neighboring village] farmers is only 100 Toman. Both groups of farmers should sell it 200 Toman. Farmers in this region should spend 500 Toman to gain only 200 Toman.
	Cost-effectiveness of small investments	<ul style="list-style-type: none"> • Most mushroom production units have an area of 60 m². We can only raise mushroom twice a year. We should use a heater in the winter but don't have budget to purchase it. ❖ Mushroom production units are small size (with area about 50 or 60 m²). It isn't cost-benefit to buy and install a heater in these units. So that the production and profits are low.
Unemployment and lack of sustainable job opportunities	Unemployment	<ul style="list-style-type: none"> • TV reporters say that unemployment rate is less than 10%. In our region, unemployment rate is very high and we know that unemployment is increasing. ❖ Someone has gone to Shiraz to work as a security man with only 500 thousand Toman salary. He owns 20 hectares of farm lands. This kind of work can't be found now. Unemployment rate is very high. ✓ Many young people were tractor drivers. Also, they had worked on their family lands. Drought and reduction of agricultural productivity have caused youngsters unemployment.
	Lack of sustainable job opportunities	<ul style="list-style-type: none"> • There is no livelihood option except agriculture. We believe that the village residents should work in cities or other provinces. If they don't want to live in misery, like us! ❖ These people are ready to work elsewhere maybe further than A. [neighboring city]. Our people have a great zeal but there's no job opportunity here. ✓ Women and their children are working in neighboring towns. Do you think that they wouldn't work in their villages if some job opportunities were provided?!
	Working out of village	<ul style="list-style-type: none"> • Our wives and young girls should go to A. and S. [neighboring cities] at 2 AM for harvesting. As a worker, their salaries are only 30 thousand Toman per day. ❖ Everyday about 150 young and middle-aged men go to Shiraz at 12 PM. They are working as labors. ✓ In all villages, you can see the same conditions. Men should go to Shiraz to find temporary jobs. Most of them are working in markets as carriers. There's no other option!
	Working at a series of unrelated or unspecialized jobs	<ul style="list-style-type: none"> • Most young people are educated. Despite high education, they're working as labors in Asaloooyeh. Our children tell us they're afraid to lose their jobs [as labors] if they go to Shiraz and participate in various classes. They prefer to gain less!
	Employment of non-local workers	<ul style="list-style-type: none"> • Urban contractors are constructing bridge, road and etc. in this region. They're employing Afghan workers not Iranians! The local government must force them to employ local people.
	Poor livelihood diversification	<ul style="list-style-type: none"> • Some people had a good economic intuition. While they were working on farm, they invested in cities. Our fault is that we thought agriculture income is enough forever. ❖ The problem is that everyone wants to earn money only from agriculture. I tell them there's no water and think about something else. They say we don't have any skill except farming. We don't have any saving and financial capital. Agriculture in this region is irrational! Who cares? ✓ Some farmers own small-scale farms. They didn't rely mainly on agriculture at all and earned money from diverse sources of income. Those who owned more farmlands are now experiencing worse conditions. Because they have relied only on farm incomes.

Table 1.

Themes	Meanings	Significant statements
Limitation of budgets and loans	Limitation of budgets	<ul style="list-style-type: none"> • When we ask Jihad [Jihad- agricultural organization] to give us loan to develop mushroom production unit, they say only we don't have any budget and you should wait till budget is assigned. ❖ We asked for budget to pave and repair our old school. The organs [local institutions] said there's no budget.
	Inability to pay off previous loans	<ul style="list-style-type: none"> • Our names are excluded from loan lists. We even were satisfied with 2 to 3 million [Toman] but the banks don't give us. Bankers tell us you should pay back your previous loans and then ask for another loan. They don't understand our miserable life! They only know money.
	Inability to pay off previous loans	<ul style="list-style-type: none"> ❖ Most people are still indebted to the bank for their previous loans. Debtors can't benefit from government loans. The bank acts based on determined rules but what should rural people do? ✓ Many times, we sent loan applications to the bank. Because of farmers' inability to pay off previous loans, the bank refused their applications. I know that the bank has its own rules but these rules negatively affect the agriculture sector and farm families.
	Failure to provide a guarantor	<ul style="list-style-type: none"> • The government says that to receive loan you should provide two guarantors. How can we find any guarantor? Nobody wants to be our guarantor because we are poor. ❖ Many people in the village apply for construction of mushroom production unit. The main barrier is their inability to provide a guarantor. The guarantor needs to be a government worker and many people don't have any relatives working for the government.
Inadequate institutional supports	Low efficiency of support mechanisms	<ul style="list-style-type: none"> ❖ Some farm families received government loans that are about 10 million Toman. While they received the loan to start their own businesses, they couldn't manage it in a right way and they couldn't pay off their debts. Now, they're both unemployed and debtors.
	Failure of farm-centric development models	<ul style="list-style-type: none"> ❖ If you think that the water flow will increase and productivity of the agriculture sector will enhance, you're making a mistake. It's necessary to forget [ignore] farm practices and just do non-agricultural activities. The government's plans mainly depend on agriculture. Neither industrial units nor technical based enterprises have been established in this region. ✓ The great problem is that there's no livelihood option except agricultural activities. Despite incidence of sever sustained droughts, all development efforts have focused on agriculture, still. We have to choose between bad and worse! We don't know if these new agricultural products, such as safflower, can adapt completely to the region but we're obliged to recommend them to the farmers.
	Poor insurance supports	<ul style="list-style-type: none"> • We purchase crop insurance to manage the risk. Otherwise, indemnity payments are very low. Our cultivation cost is one million [Toman] per hectare and they pay us only 180 to 200 thousand Toman as indemnity. ✓ Some farmers use 200 kg wheat seed for cultivation of one hectare. Some others use only 10 kg. In both farm lands, only small part of the farm that is near the canal will grow. The insurer doesn't care if the farmer uses 200 kg of seed or 10 kg. Their indemnity payments are the same.
Market limitations	Limited access to markets	<ul style="list-style-type: none"> • Some farmers cultivated safflower, last year. The safflower growth was very good. They sent harvested crop to Kermanshah. Nobody bought it and it was all returned. ❖ For quail, there's no customer. The mushroom market is just in Shiraz. Producers couldn't deliver their agricultural products to suitable markets. ✓ Mushroom cultivation is not cost-benefit. If any crop is to be cultivated, at least one suitable market is needed to supply the products. Now, farmers should transfer their produced mushrooms only to Shiraz. It's obvious their profit is not considerable.

Table 1.

Themes	Meanings	Significant statements
Market limitations	Poor recognition of potential customers	<ul style="list-style-type: none"> • Nobody buys safflower. Even if quality of wheat be low, there's still few customers for it. • One of farmers cultivated fluxweed. He harvested the crop and store it in his house. Its quality is good but nobody buys it.
	Inconsistency between products' supply and demand	<ul style="list-style-type: none"> • All produced mushrooms were harvested at the same time. The price was not good enough but we had to send them to Shiraz by motorcycle or bus. They bought our products in a cheap price. ✓ There is no refrigeration or storage here. Mushroom producers have to sell their products immediately. Increased supply would cause a sharp drop in prices.
	Poor branding	<ul style="list-style-type: none"> ❖ People believe what they see with their own eyes. If the mushrooms have a beautiful package and are produced by a famous company, it can be sold in an expensive price and result in more benefits for farmers.
Geographical constraints	Geographical isolation	<ul style="list-style-type: none"> ❖ Construction of factory is impossible in this region. This region is isolated from main cities and main roads. ✓ The geographical location of this region is a barrier for development. This region is far from main cities and industrial zones.
	Distance from power centers	<ul style="list-style-type: none"> • We have adequate water but our political voice is low and we can't get rid of our water. We must find someone in the ministry. Local authorities don't listen to us. How can we say our needs to the national government?
Limitation of farm structure	Common use of water resources	<ul style="list-style-type: none"> • Our lands and water resources are common. Each part is common between 14 farmers. This depleted water is not enough for 14 persons. Last year we irrigated only 2 hectares of our lands.
	Distance from mainstream canals	<ul style="list-style-type: none"> • Conditions of some villages are worse than ours. These villages are located in downstream and are more distant from the main canal. If we receive little water, they don't get any more. ❖ We almost always experience drought because our village is in downstream and we have low access to common water resources. ✓ Only the farmlands that are close to the mainstream canal (maybe 10 to 20 hectares of each village's farmlands) are suitable for wheat cultivation if water be released in the canal.
Knowledge limitation	Limited knowledge about the risks of new product development	<ul style="list-style-type: none"> • My son received loan and sold his car to raise ostrich. Raising ostrich has caused 90 million [Toman] loss. He owned 35 head. All got sick and died! There remained only 5 head. Those farmers who raise mushroom have the same experience due to crop diseases.
	Low awareness about efficient farm management strategies	<ul style="list-style-type: none"> ✓ Farmers' awareness about new agricultural crops such as safflower is very low and they don't want to learn, too. They don't realize that the profit of one ton of safflower is exactly similar to two tons of wheat. Also, farmers don't know medicinal plants need no water and rainfall is enough. They always say that if we want to cultivate new crops, we'll need huge amount of water. ✓ Dehdasht wheat has a high quality. But, its disadvantage is that this variety should be harvested soon. Delay in harvesting would increase wastes. Farmers know nothing about this fact and say that Dehdasht wheat is not good enough.
	Low adoption of scientific advices	<ul style="list-style-type: none"> • Mr... [change agent] said that this fall we have no rain but winter is a wet season. He recommended us to avoid wheat cultivation in the first stages. We didn't believe his advice. We cultivated wheat based on our schedule. ✓ Even though they knew surface water won't be delivered, they cultivated wheat in their farmlands. We advised them not to cultivate wheat but they did their jobs.
Ineffective extension services	Low participation in extension classes	<ul style="list-style-type: none"> ✓ Last year in one of the villages, we had a great problem. Farmers had low participation in our extension classes and instead they tried to learn from farmers of neighboring village. When we asked them why you didn't irrigate the safflower, they said it was recommendation of other farmers.
	Low effectiveness of extension services	<ul style="list-style-type: none"> • Jihad holds extension classes in the morning. This is while most farmers are working out of village and can't participate in classes. Also, their trainings are not continuous.

Table 1.

Themes	Meanings	Significant statements
Ineffective extension services	Low effectiveness of extension services	❖ Extension classes are not effective. Always they hold some classes in the village but nobody can implement these vocational trainings in practice. There's no job opportunity, no place for starting business. Why are they planning these ineffective classes?
	Failure to provide a package of adaptation strategies	❖ They [change agents] are holding extension classes for farmers and encourage them for developing mushroom production units. Is it ok if everyone wants to raise mushroom? Maybe 10 farm families can raise mushroom. What about the others? Other alternatives should also be advised to farmers.
Low adoption of innovations	Structural constraints	<ul style="list-style-type: none"> • While combinat [cultivation machine] exists in this region, we don't use it. Our plots are small and this machine is not applicable in small-scale lands. ✓ We ask farmers why don't you cultivate safflower in your farmlands? They say we don't have access to irrigation water. They are right! Nothing is clear about water distribution.
	Economic constraints	<ul style="list-style-type: none"> • Renting combinat costs 110 thousand Toman per hectare. This is while renting tractor costs 250 thousand Toman per hectare. Combinat rent should be paid on time but we can pay tractor rent costs later. That's why we prefer using tractor for cultivation. ✓ Fluxweed cultivation is a rational choice in this region. It is a low water requirement crop. But, farmers don't want to cultivate this crop. They believe that its production costs are high and its profit is very low.
	Institutional constraints	<ul style="list-style-type: none"> • We cultivate only those crops that are supported with the government. We want to cultivate medicinal plants if the government buys it. It's hard for us to find a market and customer. We still receive no support from the government.
	Psychological constraints	<ul style="list-style-type: none"> • In our village, nobody wants to cultivate fennel or cumin. We lost our capitals many times. So, we are risk averse. ✓ When we asked people to cultivate medicinal plants, they told us that we can't accept its risk and we're afraid of extra losses.
	Time constraints	<ul style="list-style-type: none"> • They recommend us to cultivate pistachio. We have suffered from 10 years' drought. We must wait 10 years for pistachio growth. That's right we are illiterate poor men but we can think carefully. We've tolerated 10 years of hunger [poverty] due to drought. Is it rational if we tolerate another long-lasting hunger? ✓ Last year, we advised the farmers to cultivate safflower. It is a low water requirement crop. They were in doubt! So, the optimum planting date passed. They protested us that we listened to your advice, why nothing is ok?
Legal constraints	Limitation of land use change options	<ul style="list-style-type: none"> • We are willing to start technical enterprises but the authorities prevent us because agricultural land use change is prohibited. A lot of money is needed for getting the government' agreement about land use change. ❖ We can't change land use. We can't raise turkey and ostrich in our agricultural farmlands. We own a farmland that is located out of the village. There's no support! Authorities say that this type of enterprise should be started in the village. ✓ Farmers usually visit us and apply for land use change. We know that drought has negative impacts on their agricultural activities but land use change is limited.
	Legal limitations on production	<ul style="list-style-type: none"> • We want to rise quail. They [authorities] say you can only raise 70 heads. It's not cost-benefit. When we protest, Jihad staffs tell us there's a legal constraint. ❖ Rural residents want to raise quail. Jihad staffs tell them there are some limitations about quail production. You can only raise 70 heads. Our people are poor. It's impossible to secure their livelihoods with 70 heads of quail. ✓ They hardly issue any permission for production. A person coming from Shiraz wants to establish greenhouse in this region. That's a good idea but we have some legal limitations.

Table 1.

Themes	Meanings	Significant statements
Low social capital	Low level of social cohesion	<ul style="list-style-type: none"> • We have many mushroom production units. If we want to pack the mushrooms, people don't accept. One says your mushroom is small and my mushroom is big [size]. It doesn't work this way. ❖ Everyone should hold each other's hands to solve the issue. The council can't do much. Cohesion of people has reduced. ✓ I asked the mushroom producers several times to hold a meeting and think about how we can prevent simultaneous supply of mushroom to the market by several producers. Unfortunately, collaboration is so weak between them. If they could help each other and establish a mushroom packing unit, it would be so beneficial for them. Now, they are all losing some benefits.
	High level of distrust	<ul style="list-style-type: none"> • The world has become so cruel. Here, nobody trusts others. No one pays back his debt. It's so that we don't dare to take any step for each other.
	Inadequate effort to get support from the government	<ul style="list-style-type: none"> • When there was no drought, we used to go to Jihad only if we wanted manure. Now, we don't go there at all. What can they do for us? ✓ Connection of people to Jihad is so weak. In the past that they had lots of income and products, they knew themselves in no need of the government. Also, now that they blame the government for their tough situations, they don't come to us.
Cultural constraints	Government dependency	<ul style="list-style-type: none"> • Just the government should suggest a solution to make situation of the village better. The government should establish a big plant here to youngsters go there and work. ❖ Our people have just waited to see what the government wants to do for them. It's right that people can't do much but whose problems should the government solve?
	Distrust to the governors	<ul style="list-style-type: none"> • What has the government done for us? Can it say we put a brick on another for farmers? We fought years for the Islamic revolution and made sacrifices. ❖ In general, the authorities don't feel much responsible, specially about this region. When we try to do anything, they make it so difficult that we regret doing it. On one hand, drought is putting pressure on people and, on the other hand, the authorities don't help much.
	Blind imitation	<ul style="list-style-type: none"> ❖ The farmers established 32 mushroom production units. It's right that they supply the mushrooms to Shiraz but how many mushroom production units does a village need? When someone starts a job, everyone wants to do the same thing. They don't think if the village has the capacity of it. ✓ When someone starts a new enterprise, everyone follows the same activity after the first one. At the moment, there are 65 mushroom production units in this region.
	Culture of silence	<ul style="list-style-type: none"> • The government prohibited rice cultivation but we didn't say anything. They caught our wheat production water, we didn't do anything. Now, it's talking about cultivating safflower. We deserve whatever happens to us. If we had a little bit of zeal, we would rise, go to other regions with water right and stand against them to make them stop getting our right. ✓ People of this region don't ask for their rights much. Seems people are satisfied with their conditions.
	Misuse of institutional resources	<ul style="list-style-type: none"> ✓ It's right that some people can't pay off their loans but some of them don't want to pay the loans back. Up to year 2007, rice was cultivated here. That time that they had money, they wouldn't pay their loans. Now, they don't have money to pay back loans.
Lack of equilibrium in	Age equilibrium disturbance	<ul style="list-style-type: none"> • Youngsters and those that can work have left the village. Just we that are old and disabled to work have stayed in the village. ❖ During drought, most youngsters that saw they can't control their lives here left the village. Just the elders have remained.

Table 1.

Themes	Meanings	Significant statements
Lack of equilibrium in ecology of population	Permanent or circular migration	<ul style="list-style-type: none"> • Our children have migrated. Just 25 families haven't migrated since they don't have any house in the town. If this few number of families had a better financial circumstance and could rent a house, they would have left, too. ❖ The situation of our village is worse than the other villages. Everyone has left because of drought. Our population was good. They left because they didn't have any job and they were unemployed. ✓ Migration rate is very high in this region. If the government doesn't succeed to find any solution, the others have to migrate, too. Anyway, the government has spent much on organizing villages and it's not good to leave these villages abandoned.
Uncertainty about future of agriculture	Managerial myopia	<ul style="list-style-type: none"> • The income we had in this area, no one had in other regions. If in that time we knew such condition will happen, we would have bought a house in the village or start another job. Who thought of such day?! ❖ Here, no one thinks or is able to think about what can be done for the forthcoming years. Everyone says that let today pass. God is great for tomorrow [God will help us]. ✓ People don't use the provided minimums. The farm families can obtain insurance by paying 400 thousand Toman annually. The government supports them by paying twice this price. But, they don't use this opportunity. Many times, we have reminded them and asked them for requesting insurance but they don't do anything.
	Fear of failure	<ul style="list-style-type: none"> • We're sick of unemployment. We don't have any life expectancy, too. We don't hope for a better future. Here has become worse than Sistan and Baloochestan.
	Uncertainty about outcome of regional development plans	<ul style="list-style-type: none"> ❖ They want to branch the water of Doroodzan dam to here. They are evaluating it. They came and recorded data about all buildings and farmlands. They also did spatial mapping. The representative said they are close to starting the project. Still, there's no news. Maybe, the water transportation project lasts 10 to 15 years. ✓ With our representative's efforts, they want to establish a cement factory that it's not obvious if the factory will be founded in the forthcoming years or not.
	Low level of institutional investment	<ul style="list-style-type: none"> ❖ With the limited money and capital that we have, we can't start any unit. Some external capitals should be attracted to here. Some investors from other regions should be motivated to start units, here. ✓ The dams caused great problems for this region. The government should had established great and complementary industries here to relieve effects of the water crisis, in these years. The government hasn't done much about it.
	Failure to pay non-cultivation	<ul style="list-style-type: none"> ❖ Our representative is trying to get some credits for the farmers through the non-cultivation plan, until reaching normal years. But, he can't do anything until this plan is not confirmed by the government. ✓ If they want to make the situation of this region better, the government should rent the lands and tell the farmers not to cultivate anything by paying them 4 to 5 million Toman per hectare. But, non-cultivation plan is not operated in this region.
	Failure to establish industrial development zone	<ul style="list-style-type: none"> ❖ There are industrial zones in other counties. Each county has 40 industrial units, at least. Here, there is no room constructed for workers.

As revealed in Table 1, quantitative and qualitative reduction of water resources have hindered rural development in this region. All groups (i.e. the farmers, managers and experts) have perceived

construction of Sivand and Molasadra dams as a main driver of water crisis in this drought-prone area. Kherameh Plain is under a critical condition and water abstraction from its depleting aquifers is

restricted. As a result, farmers have to rely on water that is released from upstream water resources (i.e., Doroodzan dam and Sivand river). However, the considerable spatial and temporal variation in distribution of rainfall in Fars Province has motivated the policy makers and governors to construct Sivand and Molasadra dams over the mainstream rivers in order to increase power generation and secure urban water supplies. Because of this regulation of water flows, less support has been provided for downstream farm systems. Given the fact that water sources are shared with several counties (e.g., Pasargad, Marvdasht, Kherameh, and Niriz), the farms close to the mainstream canal have accessed a more reliable water for irrigation than those that are more distant (e.g. farms in the study area). Therefore, equitable distribution of shared water resources is imperative. However, all three groups believe that the upstream farmers have attempted to maximize their immediate gains from the shared surface flows for rice cultivation and limited control of the government over use of the shared water has created competitions and conflicts among the counties and has intensified water crisis. Saltwater percolation into potable water sources and rural families' obligation to purchase safe drinking water were also the other obstacles against development. In the experts' views, designing and implementing an effective early warning system and preparedness schemes are essential to reduce rural households' vulnerability to drought and secure sustainable water resources. However, in Iran, drought policies rely on a crisis management paradigm. If drought occurs and water problems arise, extra effort will be put mainly into curing the problem's symptoms to return to a normal condition.

Table 1 illustrates that limitation of financial resources and investment is another barrier that has delayed the process of rural development in this drought affected area. As revealed by all groups, severe poverty and increased debt levels have put extra pressure on the vulnerable families under drought. For livestock producers, loss of income has resulted from increased production cost, which is greatly related to the increased demand for supplemental fodder to feed livestock. So that, the majority of livestock producers had to significantly reduce their household expenditures at a survival level. Furthermore, some adaptation strategies,

such as mushroom production or raising agricultural products in large-scale greenhouse, need financial and infrastructural resources. Financial constraints have confined farmers to short-scale and non-affordable production. According to Table 1, unemployment, lack of sustainable job opportunities and lack of income diversification are other major problems, in this region. Agriculture is a mainstay of economy in most rural communities. The key to reduce livelihood vulnerability to drought is finding opportunities to change the household economy in a way to make them less dependent on farm income. In this regard, farm families should have been provided with a better access to skills and subsidized loans. However, job opportunities are limited in the region. Therefore, many educated and less educated young people have kept migrating to the urban or industrial areas, such as Shiraz and Asalooyeh, to look for affordable jobs. Those who have stayed in the villages (usually non-smallholder farmers) do not have enough technical skills or other incentives to change farming and develop off-farm sources of income. However, the local managers and experts believe that income diversification through non-farm economy plays an important role in alleviating livelihood vulnerability and helps the households to reduce risks.

As Table 1 shows, the pace of development programs has reduced due to poor physical infrastructures (e.g. low quality of paved roads and inappropriate wastewater disposal) and limitation of government loans and budgets. Adequate access to credit and loan can improve rural households' livelihood under drought. However, inability to pay off previous loans or failure to provide a guarantor has made it difficult for the households to benefit from government loans. While the governors believed that more low interest loans should be provided to support drought affected families, the local managers perceived that drought relief arrangements (e.g. loans) act as a disincentive for the farm families to prepare for drought and such arrangements put further pressure on them. The reason is that most families do not have adequate skills or capacities to plan and initiate cost-effective actions. According to the local managers and experts' statements, considering agriculture as the essence of rural development and focusing on improvement of this

sector cannot resolve development problems, and paradigmatic shift in rural development policy is imperative for drought prone areas. However, no fundamental activity, e.g. industrial foundation and tourism promotion, has been started in this region. Also, the farmers and experts believed that inequitable assessment of the drought has induced losses and unfair indemnity payments have made most farmers and livestock producers prefer not to benefit from insurance programs, as a vulnerability reduction strategy (Table 1).

Moreover, the local government has failed to improve local and regional market mechanisms for untraditional agricultural products, such as mushroom, quail and safflower, and there is an inconsistency between products' supply and demand in this region. This discrepancy that is associated with poor infrastructure devices (e.g. lack of cold storage) has some major effects on fall of agricultural prices. Also, geographical constraints and limitation of farm structure are recognized as other rural development barriers (Table 1). According to the farmers' declarations, geographical isolation and distance from power centers have silenced their political voices and have disabled claiming their own rights, such as use of shared water systems. Furthermore, most agricultural lands are owned collectively by a number of farm families, and water resources are shared among more than seven users. So that common use of soil and water resources has shortened the length of time that each shareholder has access to the equity share. Such a condition has caused decreased agricultural productivity and increased risk of loss due to drought.

Findings revealed that lack of knowledge about advanced methods of raising safflower, quail, ostrich, mushroom and etc. and, also, inadequate information about their diseases have increased production costs and have reduced agricultural productivity in this drought affected area (Table 1). Lack of knowledge and information about these adaptation strategies implies that effectiveness of extension programs is questionable. Some farmers and local managers complained about absence of extension services and the others criticized the weak role of extension in taking into account needs of the farm families under drought. However, experts believed that low participation of farmers in extension workshops and classes, poor implementation of the experts' recommendations

and extension advices have intensified water crisis in this region. Furthermore, both groups of experts and farmers perceived that barriers against adoption of innovations play an important role in poverty and underdevelopment in this area. Findings revealed that limited access of farm families to financial and credit resources, low level of relative advantages of some innovations like medicinal plants, ownership of small-scale farms, inability to use new and modern agricultural machinery, poor marketing processes, unsuccessful production experiences of other farmers, fear of failure and long-term production returns especially for garden construction are major drivers of low adoption of agricultural innovations.

Also, legal restrictions have led to a significant slowdown of development in this drought-affected region (Table 1). Many young people, who have participated in vocational trainings and have improved their technical skills, need enough space to establish their small-scale enterprises. However, land use change options are currently limited due to general restrictions about conversion of farmlands to industrial units. Also, farmers insist that constraints imposed by the government regarding small-scale production of poultry or mushroom have greatly affected total income of rural families. Due to limitation of economic markets and inadequate demand for some agricultural products in this area, expansion of unit size seems irrational. Moreover, low level of social and cultural capitals is another major barrier that has prevented this region from development (Table 1). Findings illustrated that lack of empathy, low level of social cohesion, low participation in community organizations, high level of distrust and inadequate effort to get non-financial support from institutional networks have contributed to a massive deprivation and have increased rural families' reliance on government support (Table 1). At the same time, local institutes have failed to implement social risk management actions in order to reduce social inequalities and contribute to social stability. Also, low level of trust has inhibited cooperation of the rural residents with public agencies. In fact, positive effect of the trust factor has been eroded by negative appraisal of the farmers and managers regarding the competence and integrity of public agents. Blind imitation is another obstacle of rural development. From the

perspective of local managers and experts, the demand for new job opportunities or agricultural innovations should have favored rational choices and market processes rather than blind imitation. Furthermore, lack of equilibrium in ecology of population has obstructed rural development in this area. As presented in [Figure 1](#), permanent or circular migration of the young residents has increased during drought and rural communities have experienced great fluctuations in their populations ([Table 1](#)). Loss of physically strong young men can lead to an undeveloped form of agriculture that is more vulnerable to future droughts and water crisis. Since majority of the farmers and local managers believed that young people want to return to the village, support should be provided to allow young people to choose continuing farming in rural areas.

Uncertainty about future of agriculture is another impediment to development ([Table 1](#)). Loss of long-term vision and inadequate use of investment opportunities as real options have increased vulnerability of rural families under drought. Also, continuation of drought that is associated with great depletion of water resources, high levels of poverty and unemployment, and improper government assistance have made farm families uncertain about future of agriculture. Under such condition, if the rural families reach to the point that their livelihoods are no longer secure, they will be finally forced to abandon agriculture and migrate to urban areas. Inadequate attention of the local government to the problems that are embedded within this region has made development so difficult. Incomplete construction of cement factory, postponement of the water transfer project, abolition of payment for uncultivated lands, failure to establish industrial development zones and low level of investment are unending examples of mismanagement in the region.

[Figure 2](#) illustrates the interrelationships between the rural development barriers. According to the findings, a complex set of causal factors have directly and indirectly prevented this region from development. [This figure](#) demonstrates that climate variability and reduction of water resources' components are the main barriers of rural development. This implies that drought and climate-induced water scarcity pose a risk that can extremely affect rural development. The negative

impacts of climate variability are further intensified by the threat of climate change, which is projected to increase frequency, duration and intensity of drought in arid and semi-arid regions ([IPCC, 2014](#)). Therefore, rural development planners need a better appreciation of climate variability and change and their impacts on water resources in order to determine to what extent this information affects their activities and increases local and institutional adaptation to drought and water crisis. Many believe that water transfer is an appropriate strategy for acceleration of development in this region and there is an increasing pressure on the government to transfer water. However, environmental protection of Bakhtegan Lake, which is located in downstream, should also be considered as a public duty. Sustainability of this internationally-renowned lake depends on providing wise water management systems in the watershed.

Furthermore, series of heterogeneous components including unemployment and lack of sustainable job opportunities, limitation of financial resources and investment, inefficiency of institutional supporting policies, limitation of budgets and loans, and uncertainty about future of agriculture are identified as the next five most salient themes of rural development barriers ([Figure 2](#)).

As indicated in [Figure 2](#), recent severe sustained drought that is accompanied with extreme water shortage has led to unemployment, reduction of financial resources, inefficiency of government action plans, serious reduction of loans and credits and uncertainty about future. These key and sub-key stressors are identified as the major threats to agricultural systems and livelihood security of rural families. Adoption of some strategies are required to exit the crisis situation if the government does not want to lose agricultural production and confront increase of forced migration. However, credit shortage and low institutional coping capacity make development difficult to achieve. As shown in [Figure 2](#), underdevelopment of this drought prone area is also a product of various contextual stressors. For instance, agricultural extension agencies can contribute to rural development by implementing a range of social and economic incentives, vocational training and social learning programs. However, various factors including climate variability, water crisis, inadequacy of institutional

supports and budget limitation have reduced effectiveness of extension services. Failure of extension services has led to insufficient knowledge and awareness of farmers regarding adaptation to drought and low adoption of effective coping strategies. Since most farmers make

decisions based on their own limited knowledge (e.g. cultivation of high-water requirement crops), improved extension services are necessary to reduce vulnerability of farm families to drought and water crisis.

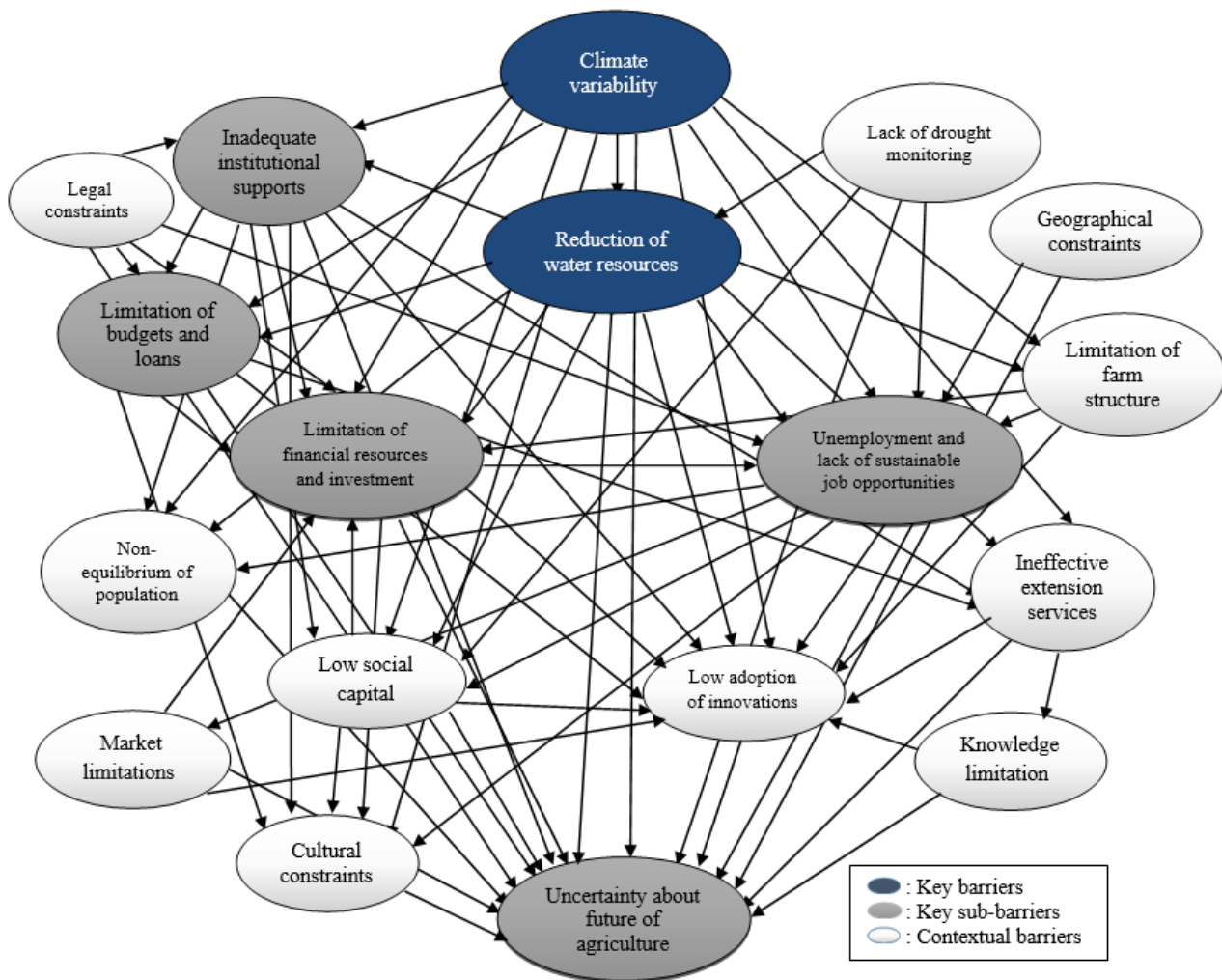


Figure 2. Barriers of rural development in drought affected area

Source: Research findings, 2017

5. Discussion and Conclusion

Rural areas play a major role in production of food, creation of job opportunities, conservation of biodiversity and natural resources and, also, reinforcement of non-oil producing economy. Prolonged and recurrent droughts, as a harsh reality of arid and semi-arid regions, pose serious challenges for development in rural communities that their residents' livelihoods depend principally

on natural resources. Though several models of rural development have been proposed, they have failed to properly explain the reasons for slowdown of development in certain rural areas. This paper attempts to provide new insights about why development appears to stagnate in drought prone areas of arid and semi-arid regions. By applying a qualitative research, it is concluded that both climatic (e.g. severe and long-lasting droughts) and anthropogenic forces have greatly reduced

productivity of agriculture and sustainability of water resources.

Various coping strategies have been adopted by farmers in order to reduce negative impacts of drought and water scarcity including changing cropping pattern (i.e. complete replacement of rice and sugar beet with cereals and then substitution of cereals with safflower or medicinal plants), developing greenhouses, rising mushroom, quail and ostrich, off-farm occupation and migration. However, the study area appears to be trapped in an undesirable state characterized by extensive poverty, unemployment and outmigration. Barriers that have created and maintained the locked-in situation of this drought prone region were identified by farmers, local managers and experts. While there was considerable consensus about roles of most barriers in deterioration of rural development, there were competing concerns about the importance and influence of institutional supports and adequacy of extension services in fostering development. The significant differences between viewpoints of the farmers, local managers and experts about development traps necessitate participation of all key stakeholders in decision making and implementation of development actions.

Findings revealed that barriers to rural development can be grouped into 65 meanings and 18 themes. Also, a thematic network diagram was used to illustrate the interrelations of rural development barriers. A thematic analysis identified climate variability and quantitative and qualitative reduction of water resources as the dominant barriers. A range of other key sub-stressors (e.g. unemployment and lack of sustainable job opportunities, limitation of financial resources and investment, inefficiency of institutional supporting policies, limitation of budgets and loans, and uncertainty about future of agriculture) and contextual barriers were also identified. Given the interconnectedness of the development barriers, multiple obstacles are needed to be removed, simultaneously. Some strategies are recommended to manage drought-induced water crisis and improve rural development in this area:

1. *Continuous monitoring of drought and developing early warning systems:* Since farming system is inherently relied on surface water resources in the study area, serious

monitoring of climatic data as well as developing early warning systems are imperative. Without this information, it is difficult to convince policy makers and governors about the need of a more equitable distribution of surface water resources and additional investment in drought mitigation and adaptation.

2. *Socio-political agreement about the distribution of common water resources:* Failure in reaching an agreement over sharing the common water resources has resulted in tragedy of the commons (i.e. aggressive water withdrawal in upstream regions) associated with high level of ecosystem damages (e.g. Bakhtegan Lake) and social conflicts. Fundamental changes in the current water distribution mechanism is essential to prevent misuse of irrigation water and secure sustainable water resources. In this respect, socio-political agreement of the regional water authorities and representatives of the farmers about regulation of water distribution (i.e. the volume and time of water releasing) and optimization of cropping pattern (avoiding cultivation of high water requirement crops such as rice in all regions) are needed.
3. *Transfer of water from other regions and allocation of water subsidies:* Due to saltwater percolation into potable water sources and critical shortage of safe drinking water, transfer of water from neighboring areas is suggested. Since water conveyance is time consuming and rural poor people are obliged to purchase potable water, allocation of water subsidies to highly vulnerable families is required.
4. *Local participation in development planning:* While severity and continuation of the current drought is unprecedented, it is expected that this region experiences more prolonged and intense droughts in the future. Negative consequences of climate variability and change on rural households' livelihood will be increasingly serious unless the reliance of these families on agriculture-based economy is decreased. In order to reduce resistance of farm families against change (e.g. changing cropping pattern or introducing alternative jobs) and avoid mismatch between the water delivery capacity and regional water demand, empowering farm families to participate in decision making is required.

5. *Encouraging research centers to focus their research on investigating and producing water resistance crops*: As discussed by Bazrafkan (2015), if minimum water flow is released, only cultivation of barley, rose, saffron, wheat, safflower and triticale will be possible in this drought-affected region. However, if the current irregular water distribution continues, cropping pattern will be limited to medicinal plants and rain fed cereals. Therefore, more effective strategies should be introduced by research centers in order to reduce vulnerability to drought and water crisis.
6. *Improving drought management information through effective extension services*: In order to enhance knowledge and information of farm families about effective coping strategies, outreach of extension services should be enhanced. Holding extension classes in the morning or cessation of vocational training have led to low participation of the farmers. Planning to present regulatory extension workshops in leisure time of the farmers is suggested. Moreover, some farmers have no incentive to change the traditional farming practices and adopt new technologies/crops to improve efficiency of their activities. As an outcome, adoption of effective innovations should be facilitated by extension agencies.
7. *Planning and implementing business management workshops for farmers*: Since access of farmers to the new technologies has increased and new water resistance crops (e.g., safflower) have been introduced, acquiring knowledge about business management and simplified accountancy is necessary. Such courses should explain the advantages and disadvantages of different types of business structures to put farmers in the position of making rational choices.
8. *Promotion of agro-based industries*: Agro-based industries can offer employment opportunities, enhance income and profitability within local communities and reduce extra pressures on water resources by comprising vertical integration towards the market. Adequate support from the government is required due to the rudimentary of agro-based industries in this region.
9. *Linking urban-based businesses to small-scale crop producers*: Due to high water scarcity and geographical isolation, foundation of large or medium-sized industries is not cost-effective, in this region. It seems that linking small-scale manufactures to rural families can foster development in this drought-prone area. This strategy has been successfully implemented in Taiwan and South Korea. This rural-urban partnership is a win-win approach, which helps urban manufactures to reduce their production costs. At the same time, it can create various job opportunities and increase standard of living in rural communities.
10. *Developing rural growth centers*: Farm families who have suffered more from drought impacts have perceived education as a key to a better future outside agriculture. However, job opportunities are limited for higher educated people. In order to promote their competencies, developing rural growth centers is offered.

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واکاوای تنگناهای توسعه روستایی در شرایط خشکسالی

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چکیده مبسوط

۱. مقدمه

مناطق روستایی به دلیل برخورداری از کارکردهای مختلف همچون تأمین غذا و مواد خام، حفاظت منابع و مناظر طبیعی، ایجاد فرصت‌های شغلی مولد و تحقق اقتصاد غیروابسته به نفت نقش بسزایی در رونق‌بخشی و شکوفایی اقتصاد کشورهای در حال توسعه دارند، اما بروز خشکسالی‌های شدید و طولانی‌مدت از بهره‌وری بخش کشاورزی کاسته و منجر به افزایش تنش آبی، فقر، بیکاری، ناامنی غذایی و مهاجرت گردیده است. بدیهی است بهره‌گیری نامناسب از ظرفیت‌های زیست‌بوم، فرهنگی و اجتماعی مناطق روستایی به همراه طرح‌ریزی نادرست برنامه‌های توسعه روستایی در شرایط وقوع بحران‌های طبیعی همچون خشکسالی می‌تواند بر دامنه مهاجرت‌های روستایی بیافزاید. به همین دلیل، واکاوای تنگناهای توسعه روستایی در شرایط خشکسالی ضروری می‌باشد. با توجه به اینکه تا کنون مطالعه‌ای در زمینه تنگناهای توسعه روستایی ایران در شرایط مواجهه با بحران خشکسالی انجام نگردیده است، این پژوهش کیفی با هدف پر کردن این شکاف دانشی و تبیین دلایل بازماندن برخی مناطق روستایی از روند توسعه در خلال دوره خشکسالی انجام شده است.

۲. مبانی نظری تحقیق

تعریف جامعی در خصوص مفهوم توسعه روستایی ارائه نشده است، اما باور عمومی چنین است که توسعه روستایی «فرایند پایدار تغییر اقتصادی، اجتماعی، فرهنگی و زیست‌محیطی است که به منظور افزایش رفاه جوامع روستایی در درازمدت طراحی شده است». در حال حاضر مدل‌های مختلف توسعه روستایی ارائه گردیده‌اند که از آن جمله می‌توان به مدل‌های مزرعه‌محور، برونزا، درونزا و درونزای نوین اشاره کرد. مدل مزرعه‌محور، استمرار بقای روستا را در گروهی افزایش بهره‌وری بخش کشاورزی می‌داند. این در حالی است که در مدل برونزا، مناطق شهری به‌عنوان موتور محرک توسعه روستایی قلمداد شده و

فرض بر این است که جذب سرمایه بیرونی، زمینه‌ساز رونق اقتصاد روستایی می‌باشد. از سوی دیگر، مدل درونزا؛ تمرکز بر منابع طبیعی و ارزش‌های فرهنگی مناطق روستایی را شرط اساسی دستیابی به توسعه روستایی می‌داند. این در حالی است که مدل درونزای نوین بر وابستگی منابع درونی مناطق روستایی و عوامل بیرونی تأکید کرده و ایجاد ظرفیت‌های نهادی محلی و تمرکز بر نیازهای مردم را راهگشای توسعه روستایی می‌داند. هر چند مدل‌های مختلف توسعه، راهکارهای متفاوتی را برای تحقق توسعه روستایی ارائه داده‌اند اما یکی از وجوه اشتراک این مدل‌ها، ناتوانی آنها در تبیین دلایل رکود توسعه در برخی مناطق روستایی است.

۳. روش شناسی

به‌منظور واکاوای تنگناهای توسعه روستایی در شرایط خشکسالی نسبت به انجام مطالعه موردی در شرق استان فارس (شهرستان خرامه) اقدام شد. طولانی‌ترین خشکسالی بوقوع پیوسته در این منطقه، خشکسالی هواشناسی و هیدرولوژیک دوره ۹۴-۱۳۸۵ می‌باشد که پیامدهای منفی آن همچنان در منطقه مشهود است. داده‌های مورد نیاز پژوهش در سه مرحله مجزا گردآوری شد که به‌ترتیب عبارت بودند از: (۱) انجام مصاحبه گروهی متمرکز با کشاورزان هشت روستای آسیب‌دیده از خشکسالی، (۲) انجام مصاحبه نیمه‌ساختار یافته و عمیق با دهیاران یا روسای شورای روستاهای مورد مطالعه، (۳) انجام مصاحبه عمیق با کارشناسان سازمان‌های جهاد کشاورزی، تعاون روستایی و آب منطقه‌ای استان فارس و شهرستان خرامه. برای تبیین تنگناهای توسعه روستایی در شرایط خشکسالی از راهبرد ارائه شده توسط کولایزی بهره گرفته شد. بدین منظور، ابتدا بیانات و عبارات معنی‌دار شناسایی شدند و سپس به تجمیع مفاهیم استخراج شده در قالب مقوله‌ها مبادرت گردید. با تجمیع تمام مقوله‌ها، توصیفی جامع از تنگناهای توسعه روستایی در شرایط خشکسالی حاصل شد.

۴. یافته‌های تحقیق

راهکارهای مختلفی برای سازگاری با خشکسالی و کم‌آبی مورد استفاده قرار گرفته که از آن جمله می‌توان به کاهش سطح زیرکشت، کاهش مصرف کود و سموم شیمیایی، ممانعت از کاشت برنج و چغندر قند، توسعه دامپروری، تغییر الگوی کاشت، گسترش کشت گلخانه‌ای و رویکرد به پرورش قارچ، بلدرچین و شترمرغ، رویکرد به مشاغل غیرکشاورزی و مهاجرت روستایی اشاره نمود. مروری بر یافته‌های پژوهش نشانگر آن است که علیرغم کاهش بهره‌وری بخش کشاورزی در خلال خشکسالی، تمام تلاش‌های توسعه همچنان بر محور کشاورزی استوار بوده است. از سوی دیگر، تشدید بحران آب در منطقه روند طرح‌ریزی و اجرای برنامه‌های توسعه‌مدار را کند ساخته و هیچ فعالیت زیربنایی همچون گسترش زیرساخت‌های توسعه صنعتی و گردشگری در این منطقه صورت نگرفته است. هر چند خشکسالی نقش بسزایی در بازماندن منطقه از روند توسعه داشته است اما وجود تنگناهای مختلف همچون افزایش نوسانات اقلیمی، کاهش کمی و کیفی منابع آب، افزایش بیکاری و نبود فرصت‌های شغلی پایدار، ضعف منابع مالی و سرمایه‌گذاری خانوارهای روستایی، ناکارایی سیاست‌های حمایتی دولتی، محدودیت اعتبارات دولتی و تسهیلات بانکی، پایش نامناسب خشکسالی و عدم استقرار سامانه‌های هشدار زودهنگام خشکسالی، محدودیت جغرافیایی، محدودیت ساختار مزرعه، نارسایی فعالیت‌های ترویجی، محدودیت دانش و آگاهی، وجود موانع پذیرش نوآوری‌ها، برهم خوردن توازن جمعیت، پایین بودن سرمایه‌های اجتماعی و فرهنگی، محدودیت و نارسایی بازار و ابهام درباره آینده کشاورزی و منطقه نیز موجب شده که این منطقه همچنان با بحران توسعه مواجه باشد.

یافته‌ها نشان داد که شبکه پیچیده‌ای از روابط علی میان موانع توسعه روستایی در این منطقه وجود دارد. بنحوی که هر یک از عوامل نه تنها بخودی خود موجب ایجاد وقفه در روند توسعه می‌شوند، بلکه با تأثیرگذاری بر سایر عوامل بر شدت اثرات نامطلوب می‌افزایند. واکاوی روابط علی نشانگر آن است که محدودیت‌های اقلیمی و منابع آب

اصلی‌ترین موانع دستیابی منطقه به توسعه می‌باشند. از سوی دیگر، پنج سازه افزایش بیکاری و نبود فرصت‌های شغلی پایدار، محدودیت منابع مالی و سرمایه‌گذاری خانوارهای روستایی، ناکارایی سیاست‌های حمایتی دولتی، محدودیت اعتبارات دولتی و تسهیلات بانکی و نهایتاً ابهام درباره آینده کشاورزی و منطقه از زیر عوامل اصلی زمینه‌ساز توسعه نیافتگی در منطقه می‌باشد.

۵. نتیجه‌گیری

این پژوهش، فارغ از جهت‌گیری‌های موجود در راهبردهای توسعه به دنبال یافتن پاسخی روشن برای توسعه نیافتگی مناطق روستایی در شرایط خشکسالی‌های شدید و مستمر بود. یافته‌های این پژوهش کیفی نشان داد که روند توسعه روستایی در منطقه مورد مطالعه نگران‌کننده است و بیم آن می‌رود که با افزایش فقر و مهاجرت، انجام مداخله‌گری‌های مختلف توسعه‌مدار توجیه‌ناپذیر گردد. با توجه به اینکه روابط علی و پیچیده‌ای میان عوامل زمینه‌ساز توسعه نیافتگی روستایی حاکم است، تحقق توسعه روستایی نیازمند از بین بردن همزمان موانع اصلی می‌باشد.

بدین منظور پیشنهاد‌های شامل پایش مستمر خشکسالی و استقرار سامانه‌های هشدار زودهنگام، توافق سیاسی- اجتماعی در زمینه نحوه توزیع منابع آب مشترک، انتقال آب شرب از مناطق همجوار و تخصیص یارانه آب، مشارکت حداکثری مردم منطقه در برنامه‌های توسعه، مشارکت مراکز تحقیقات در امر پژوهش در زمینه گیاهان کم‌آب متناسب با اقلیم منطقه، ارتقای نظام اطلاعات مدیریت خشکسالی از طریق ارائه خدمات ترویجی کارآ، برگزاری دوره‌های کوتاه‌مدت مدیریت تجاری/ حرفه‌ای برای کشاورزان و غیره برای مدیریت آب و تسهیل فرایند توسعه در منطقه ارائه می‌گردد.

کلیدواژه: تنگناهای توسعه روستایی، خشکسالی، احداث سد، خانوار روستایی، مدیریت خشکسالی، فارس.

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