

## Capabilities of wheat crop farmers in the selected war zones in Afghanistan

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### Abstract

Wheat is Afghanistan's principal food crop, and sustaining its production is critical to guaranteeing food security and self-sufficiency. Wheat crops contributed approximately 60% to 75% of total calorie consumption in the country. However, as a country that has been at war since 1978, it has been difficult for the wheat production enterprise to keep up with demand in order to feed the population. In order to be resilient in their operations and grow in the face of conflict and war, the players in this industry may have to withstand, survive and adapt to different situations and phenomena within the conflict and war conditions as compared to the normal wheat production context in the peaceful countries. Hence, the objective of this research is to look into the capabilities of the parties involved in wheat crop production in a prolonged war zone. This research was based on a qualitative case study. Interviews, observations, and documents were used to gather the necessary information, which was then analyzed using thematic analysis. This study revealed that ten out of fourteen capability constructs of resilience framework were applicable while four were not applicable in a war zone. This study also found some specific capabilities that wheat crop farmers possess and enable them to produce wheat crops in war conditions. This study provided new information regarding farmers' capabilities in agriculture production in a war zone.

## 1. Introduction

In 2017, Afghanistan's agriculture sector contributed roughly 23% of the country's GDP, making it the second largest after the service sector (CSO, 2019). The agriculture sector is vital to people's livelihoods, with more than 80% of Afghanistan's population engaging in it directly or indirectly (Hashimi *et al.*, 2020). Agriculture is a source of income for almost half of all Afghan families, and it employs approximately 40% of the country's workforce (World Bank, 2014). It supports Afghan women, and vulnerable groups (poor, landless, and nomads), and provides opportunities for workers to increase production and reduce poverty and food insecurity in villages (World Bank, 2014). The main agricultural activities in Afghanistan are cereal and other annual field crop production, which accounted for about 37% of the total agricultural GDP in 2017 (Stanikzai *et al.*, 2021). Wheat production makes the most important part of this aspect (it accounts for one-quarter of GDP in

agriculture) (CSO, 2019). Wheat is Afghanistan's first staple food crop (Kakar *et al.*, 2019), and keeping its production is critical to guaranteeing food security and self-sufficiency. Crops are grown on just around 14% of the total land area due to the country's rugged geography and arid to semi-arid climate. Wheat crops cover around 70% of the total cultivated land (Chabot and Dorosh, 2007). Wheat (flour) dominates the Afghan diet, and Afghanistan is among the world's top wheat users per capita (Zanello *et al.*, 2019). In Afghanistan, wheat and its products account for almost 60% to 75% of total calorie consumption (World Bank, 2005).

Afghanistan was self-sufficient in wheat prior to the war (before the Soviet Union occupied the country) and even traded the surplus to other countries. However, due to a decrease in wheat production caused by the war, the country now imports an average of 1.2 million MT per year (World Bank, 2014). While Afghanistan was self-

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sufficient in wheat production prior to the war in 1974 (Wesa, 2002), production deteriorated throughout the conflict years due to the combined effects of prolonged droughts and the destruction of irrigation channels and infrastructure. First, the devastation caused by the Afghan-Soviet battle, and then the civil conflict that followed the Soviet exit in 1989 (Persaud, 2013; Chabot and Dorosh, 2007). Wheat production continued to decline during the civil war, which lasted from 1989 to 2001. After America's invasion of Afghanistan in 2001, the gap between wheat crop production and consumption widened. Meanwhile, wheat imports from outside the country have surged. Four decades of constant conflict, social upheaval, constant returnee movements, civil strife, insurgent activity, and numerous natural disasters have left people in desperate situations, causing Afghanistan to be in constant humanitarian need. Widespread violence, poor rain-fed staple agriculture, and limited economic options are the main causes of chronic food insecurity in Afghanistan (USAID, 2020). Besides the destruction of the agriculture sector caused by war, some farmers are still capable of producing wheat crops in the war zone. Therefore, this study focuses on the capabilities that farmers show in withstanding war conditions in order to produce wheat crops in the war zone.

The word "capabilities" represents the strategic management's major role in adapting, integrating, and reorganizing resources, organizational abilities, and functional competencies to respond to external environmental challenges (Ponomarov and Holcomb, 2009). Capabilities or distinguishing skills comprise those characteristics, capacities, organizational processes, knowledge and skills that allow a business to achieve superior performance and continuous competitive advantage over its rivals (Ponomarov and Holcomb, 2009). Capabilities are "attributes that enable an enterprise to anticipate and overcome disruptions" (Pettit *et al.*, 2010). Capabilities are "attributes required for performance or accomplishment" (Merriam-Webster, 2007). These capacities could prevent a real disturbance (e.g., security procedures to dissuade a terrorist attack), mitigate the impacts of a disturbance (e.g., stockpiles of emergency supplies) or allow adaptation after a disturbance (Pettit *et al.*, 2010). Wu *et al.* (2006) explained capabilities from viewpoint of an organization and argue that capability is a construct of a higher order that relies on resource bundling. Resources build capabilities when combined and used together (Grant, 1991). Bundling of resources is required to create specific value-creating capabilities (Sirmon *et al.*, 2007; Sirmon *et al.*, 2008) and is possibly advantageous to those competitors (Lu *et al.*, 2010). The nature and use of capabilities can help illustrate how

companies gain or maintain competitive advantage (Wu *et al.*, 2006).

Literature review showed that most of the scholars focused on understanding farmers' capabilities from various viewpoints such as learning to export and increasing farmers' capabilities through partnerships (Bolo, 2010), measuring informational capabilities in accessing the market (Magesa *et al.*, 2020), the contribution of mobile phones in expanding human/farmers' capabilities (Msoffe and Lwoga, 2019), impacts of information and communication technology on farmers' decision-making (Ali and Kumar, 2011), farmers' adaptive capabilities against drought (Maltou and Bahta, 2019), determinants of farm diversification: entrepreneurship, marketing capability and family management (Yoshida *et al.*, 2019), a typology of agriculture production systems: capability building trajectories (Wong and Lim, 2019), livelihood capabilities' diversification strategies among small-scale coffee farmers (Kimaro, 2020)

To look at building farmers' capabilities in export, Bolo (2010) investigated the effects of partnerships in Kenya's flower industry. While the partnerships have achieved their market access goal, he discovered that smallholder farmers are "locked in" to regular production functions but "locked out" of value-added activities that are likely to harm exporters' interests. Contract conditions enshrine this "lock in – lock out" relationship even more. Studying the capabilities of another niche of farmers i.e., smallholders in accessing the market in Tanzania, Magesa *et al.* (2020) found that informational capabilities are multi-dimensions, and their improvement empowers farmers in agriculture marketing. Studying the impacts of using mobile phones on farmers' capability. Msoffe and Lwoga (2019) found that farmers were able to improve their financial, human, and social capabilities through mobile phone services, according to the study. It also improved access to information and communication services while lowering transportation expenses. In a similar study, Ali and Kumar (2011) revealed that users of ICT have much higher decision-making abilities on numerous agricultural practices across the agricultural supply chain than non-users, according to the study. Furthermore, consumers' socio-demographic backgrounds, such as educational levels, social categories, income levels, and landholding size, have a substantial impact on decision-making abilities. The effect is most noticeable in production planning, post-harvest, and marketing decisions. Looking into adaptive capabilities against drought in South Africa, Maltou and Bahta (2019) found that only 9% of smallholder livestock farmers were drought resilient. Farmers who had access to credit, farmers who got

government support during drought (i.e., training and feed), and farmers who were members of a cooperative were all found to be more robust to agricultural drought. Using structural equation models by Yoshida *et al.* (2019), farmers' marketing abilities are found to mitigate the favourable impact of entrepreneurial ability on diversification. Furthermore, while a desire for the farm to remain a family business has a detrimental impact on entrepreneurship and diversification, a desire for the farm to make a social contribution has a favorable impact. According to Kimaro (2020), small-scale farmers' willingness to adopt new livelihood diversification strategies is influenced by a lack of credit facility (capital) and available economic prospects.

The findings presented above appear to be consistent in the literature on farmer capabilities. All of this research focused on farmers' decision-making ability, the use of communication technology, and farmers' access to agricultural inputs in a peaceful zone. Farmers' capabilities to practice agriculture activities in an active/ongoing and long-term war zone are not understood. Therefore, the current study employs a qualitative case study approach to investigate wheat crop farmers' capabilities in wheat crop production in war zone.

## 2. Materials and methods

### 2.1 Location of study

Through the experiences of all stakeholders (i.e., farmers, extension officers, and cooperative members) involved in the wheat crop sector, the study intends to determine the capability level of farmers in being resilient in the production of wheat crops in a conflict zone. This research was conducted in five provinces of Afghanistan: Kunduz, Logar, Kapisa, Parwan, and Panjshir. The five provinces were chosen based on the effects of war they witnessed during various periods of conflict, including the Soviet Union's occupation, civil war, and the current American occupation.

### 2.2 Sampling method

A qualitative case study investigation was used to conduct this study. The snowballing technique of the purposive sampling method was used to acquire data from informants. Informants were engaged in the industry of wheat crops and were affected by the armed conflict during SUO, civil wars, and American invasion. Farmers and cooperative members are engaged in wheat crop production, while agricultural extension officers provide them with agricultural extension services.

The interviews were conducted with a total of twenty-three male informants. One extension officer from each province was among the informants. Six of the

informants were from various cooperatives across all five provinces. The remaining informants, a total of 12, were individual farmers from the five provinces. The criteria for selecting informants were as follows: 1) All selected informants must be involved in the wheat crop industry; 2) they must be in a war zone or be directly or indirectly affected by war, and 3) they must be knowledgeable about the subject matter.

The researcher performed in-depth (face-to-face) interviews to gather information from the informants. All of the interviews took place between August and October of 2018. The interviews were conducted in a combination of Pashto and Dari (both local and national/official) languages because the informants spoke to them in different provinces and locations. Each interview lasted anywhere from 35 minutes to 2 hours, and they were all audio recorded. Through in-depth interviews, the researcher was able to collect the informants' "real-life" experiences in order to obtain more valid information. Information was gathered until the saturation point was reached. Observations were made during case site visits in addition to the interviews.

### 2.3 Data analysis

Collect data was analyzed through thematic analysis. The transcription of interviews was the first step in data analysis. The interviews were transcribed in Dari and Pashto languages. For analysis, nearly 19 hours of interviews resulted in 120 single-spaced typed pages. Farmers, cooperative members, and extension officers were divided into three groups during interview transcription. Concurrently, all three groups of transcribed interviews, as well as field notes from observations, photographs, and videos, were analyzed. All interview transcripts were read line by line, with data extracted and coded as needed. A total of 198 open codes surfaced for cooperative members, 180 for farmers, and 174 for extension officers during the open coding procedure. Later, all open codes were categorized into 14 capability constructs of the Pettit *et al.* (2010) resilience framework.

### 2.4 Theoretical framework

To conduct the study, the researcher adapted and used the resilience framework of Pettit *et al.* (2010). This framework consists of two constructs called vulnerability and capability. According to Pettit *et al.* (2010), vulnerabilities make a firm susceptible to disruptions while capabilities enable an enterprise to anticipate and overcome them. Thus, according to Pettit *et al.* (2010) resilience is the balance between vulnerability and capability. Through using the framework, the researcher was able to develop questions that were used in data

collection. The capability constructs of Pettit *et al.* (2010) resilience framework include flexibility in sourcing, flexibility in order fulfilment, capacity, efficiency, visibility, adaptability, anticipation, recovery, dispersion, collaboration, organization, market position, security, and financial strength.

### 3. Results

This section discusses the capabilities that farmers, cooperative members, and extension officers demonstrate in their efforts to produce wheat crops in a war zone. According to Pettit *et al.* (2010) capabilities are “attributes that enable an enterprise to anticipate and overcome disruptions”. Capability constructs are discussed in the context of the war zone below.

#### 3.1 Flexibility in sourcing

To be resilient, wheat crop farmers should be able to source required inputs from different sources in a war zone. In a war zone, when farmers face a lack of agricultural inputs, they solve the problems through multiple usages of input or sourcing it from multiple sources. In a war zone, the extension relationship between farmers and the Department of Agriculture is strained. Department of agriculture cannot meet farmers' demands (demands for agricultural inputs i.e., fertilizers, and certified seeds), thus, farmers use one input i.e., seeds repeatedly (for many years/seasons) and source it from different sources such as fellow farmers and traders. In such conditions (in lack of extension services) a farmer will continue cultivating one (previously given) variety of seed until he receives positive results (good yield) from it. This scenario is best described in interviews with two farmers (Farmer 11, Farmer1) from Kapisa and Logar provinces. They said:

“... Sometimes it happens that we use one type of seeds for many years for example currently I have been using one type of seed for 4 years...” (Farmer 11, August 28, 2018).

“Once we get good, improved seeds, we continue cultivating it till we get negative results (less yield) from it. In other words, we cultivate it until its outputs decrease or the plants get infected with a sickness. Me myself bought Gul96 variety of wheat and cultivated it for 6 consecutive years until its yield decreased and was not able anymore to give me the former amount of yield. Therefore, I removed those seeds and bought another one” (Farmer 1, September 3, 2018).

In addition to multiple usages, if a farmer in a war zone faces shortage of input, he will keep production by employing local and traditional inputs. For example, farmers will replace using chemical fertilizers with

animal manure, tractors with bulls for ploughing farmland, and certified seeds with local varieties. This case is well explained in an interview with a farmer (Farmer 6) from Panjshir province. He added:

“In war condition we use traditional inputs. For example, we use animal manure instead of chemical fertilizer and if we do not own certified seeds, we use local seeds. Similarly, if one trader cannot provide us inputs in needed time, we buy inputs from other traders” (Farmer 6, August 26, 2018).

Sometimes, a farmer sources inputs from fellow farmers, local traders, and to some extent from the agriculture department. Exchanging inputs amongst farmers or cooperative members is a usual practice. In case farmers and cooperative members cannot receive certified seed from the agriculture department and cannot buy it from the market or traders, they exchange their inputs with each other. Even sometimes farmers exchange one input for another input. For example, they exchange wheat seeds for chemical fertilizers, or they will exchange wheat seeds (cultivable) for wheat grains (eatable). According to a farmer (Farmer 2) from Logar province, if farmers cannot go to the market to buy required inputs, they exchange them with each other or sometimes they buy inputs from other farmers:

“During the war time if we cannot buy our inputs from bazar, in this case we buy it from farmers who have harvested good output from their farm. Sometimes we pay them cash but sometimes we exchange our wheat grain (exchange wheat grain for wheat seeds) with them. It has even happened that we have used one type of seed for many times such as 2 years” (Farmer 2, September 3, 2018).

#### 3.2 Capacity

Availability of assets such as reserve capacity (cool storage) and communication (relationship) amongst farmers, cooperative members and agriculture department for the sustained production of wheat is of importance in a war zone. To make it more specific, a good relationship between farmers and extension officers is very important because like farmer, extension officer has an important role in the production of agricultural products too. Extension officers help farmers to adopt new technologies, control plant diseases and help farmers in the proper application of chemical fertilizers and pesticides. In the absence of a good relationship between farmers and extension officers, farmers cannot produce sustainably. Communication between farmers and extension officers getting better in provinces recovered from war, particularly from SUO. In these provinces, extension officers are able to get to the field

and solve farmers' problems to some extent. To further enlighten it, a farmer (Farmer 12) from Kapisa province said:

*“Department of agriculture usually distribute us certified seeds with instalment. Besides that, department of agriculture provides us tractors for 7 to 8 years with subsidies (lower price) compared to normal price in market. For example, if the price of a tractor service in bazar is 700 to 800 Afghani per hour, we only pay 500 to the department of agriculture. No NGOs has helped us yet. When we get inputs from traders, we should pay them simultaneously” (Farmer 12, August 28, 2018).*

In addition to communication/relationship, the existence of reserve capacity (cool storage) is of importance for the sustainable production of agriculture produces. Cool storage enables farmers to supply their produce at good price off-season. This encourages agriculture development in a war zone. There is some positive development regarding storage building in provinces that have recovered from war (SUO). Even though these storages are not well equipped but still can be considered a significant step in the development of the agriculture sector in a war zone. In respect to that, Farmer 8 from Panjshir province further said:

*“We can continuously produce for market if we have cool storages. If we have the facility of cool storages to keep our products fresh, we can supply it to other markets too. Some people have built cool storages but these are not considered as standard cool storages” (Farmer 8, August 26, 2018).*

In addition to the construction of storage by the government (agriculture ministry), private storage has been also built in some areas to collect and preserve the agricultural produce of farmers. Although these storages face a lack of electricity, it still plays important role in preserving agricultural produces. These cool storages have been built underground in cold areas using traditional techniques that enable farmers to preserve produce for some time. This scenario is further elaborated by Farmer 1 from Logar province. According to Farmer 1, the department of agriculture has built some cool storage for farmers. He said:

*“Although department of agriculture in Logar province has built some storages for farmers, the numbers of these storages are limited as well as its capacity for preserving produces. Farmers know the values of storages better because during the harvesting time our wheat grain price is 150 AFG but after 3 months it raises to 190 - 200 AFG. So, in this case if we have access to storage our outputs will not spoil and we will be able to sell it with good prices” (Farmer 1,*

*September 3, 2018).*

### 3.3 Efficiency

Efficient usage of resources is important for wheat crop farmers in a war zone. First, wheat crop farmers are poor and not able to purchase it from the market in needed time. Second, the department of agriculture is not able to help them to provide inputs in the needed time. Besides that, there are no credit services to support farmers in obtaining agriculture inputs in order to produce constantly. In this case, farmers cultivate their lands with a crop that yields well and can get a good income. In an interview, Farmer 5 from Panjshir province mentioned that besides taking good care of crops, crop selection is also important for efficient usage of the asset (land). Meaning that wheat crop yields less than fruits so it is better for them to produce fruits compared to the wheat crop. He further said:

*“Taking good care of crop (wheat) is also important but wheat cannot produce as much as orchards do. Besides, taking good care of plant is important too. If we do not take good care of crops, they will not yield well” (Farmer 5, August 26, 2018).*

Another farmer (Farmer 1) from Logar province stated that they do not have any other asset to use efficiently during the production process but what they do is that they cultivate a crop based on the type of the soil. Meaning that they only cultivate crops adapted to soil texture to produce more.

*“Except farmland, farmers do not have any other resource to use efficiently. In order to efficiently use their lonely asset (farmland), farmers select a crop for cultivation based on the type of soil. For example, in our soil onion yields well but if we cultivate bean here, the yield will not be good. So, based on the soil type and climate we select a crop to cultivate. We cannot produce based on market demand because some farms have either shortage of water or not capable of good production” (Farmer 1, September 3, 2018).*

### 3.4 Visibility

Farmers are vulnerable to the quality of the inputs they utilize in the production process. To have an increased level of production, knowing the status (quality) of inputs and the environment of production is important for wheat crop producers in a war zone. Farmers usually know the status of some of their assets through observing and experimenting (farm intelligence gathering) the inputs (i.e., high-quality and low-quality seeds) and exchanging their experiences with each other's related to input. Understanding the quality of the inputs enables them to expect good output from the

crops. In an interview a farmer from Parwan shed light on his own experiment regarding knowing the status of his assets (seeds):

*“We know the status of our assets. Except the chemical fertilizer that we do not know its quality, we know the quality of the seeds we receive from the department of agriculture. If we harvest good output from the cultivated seeds, we cultivate the same seed again otherwise we do not cultivate it” (Farmer 3, August 29, 2018).*

Farmer1 from Logar province described the process of understanding the status of his asset:

*“Once a farmer cultivates a crop, he will take note of its yield. If the yield is good and the crop is resistant to plant diseases and adaptable to the climate, he will continue its further cultivation. To know their asset status better, farmers use the instructions of agriculture department, and they also share their experience from their inputs with each other” (Farmer 1, September 3, 2018).*

Besides experimenting, farmers exchange information in order to understand a specific input. Based on the information provided by a farmer, other farmers will take a decision on whether to use the input. In this respect Farmer 2 from Logar province elaborated it further:

*“We (farmers) share our technical knowledge with other farmers if they ask for. We guide them in cultivating a specific crop and how to take care of that crop. Besides sharing information with other farmers, if we have good seeds that they need, we provide it to them as well” (Farmer 2, September 3).*

### 3.5 Anticipation

Even though discerning future events need advanced technologies which farmers do not have access to, farmers use past experiences to forecast some of the future events. In this regard, Farmer 7 said that farmers can anticipate some of the future events and their implications based on their experiences from past events. Based on past experiences farmers take cautious measures to prevent damages to their farms and outputs and continue production. Farmer 7 further added from Panjshir province and said that:

*“Sometimes we know the results of some events that happens, and we know it from our past experiences. For example, if it rains heavily, we know that it may cause flood, so we take our outputs and equipment from vulnerable areas to safe areas. Sometime government provide us with information too. For instance, if they*

*have military operation, they inform us about” (Farmer 7, August 26, 2018).*

The government provides information related to large military operations to people residing in the war zone in order to prevent civilian casualties. Based on the past experiences farmers also understand if the war will be increased or decreased in their area next spring (next year). Thus, farmers decided what to cultivate and when to cultivate. To some extent, the government is providing information about future events and weather conditions. However, since the relationship between the government and farmers in the war zone is staggering, farmers cannot get related information on time. This case is best described by Cooperative member 4 from Logar province. He said:

*“We cannot forecast droughts and natural disasters because from one side government does not inform us on time, from the other side farmers themselves do not know about the conditions of weather. Moreover, currently all Afghans knows about the war conditions that where war will intensify next year and where war will decrease. Based on these information farmers decide where to cultivate and what to cultivate. Local residents know where Taliban can influence and where cannot...” (Cooperative Member 4, 2018).*

### 3.6 Dispersion

The majority of farmers in Afghanistan are smallholders and possess less than two hectares (an average of 1.4 hectares) of irrigated farmland (Pervez et al., 2014). Thus, it is not needed to distribute or decentralize their asset (i.e., lands) amongst family members. What they do is that they counsel in family and make a joint decision with respect to what crop to cultivate and what not to cultivate in their farmland. In this regard, a farmer (Farmer 12) from Kapisa province said:

*“Since our family help us with farming activities, we involve them in decisions making regarding resources allocation too. We decide together what to cultivate and what not to”.*

Similarly, another farmer (Farmer 7) from Panjshir province said:

*“In resource allocation for cultivation, we involve our family too. We jointly decide what to cultivate this year and what not to cultivate”.*

Besides individual farmers, when cooperative members (group farmers) face a problem related to agricultural activities, they get together and decide how to solve the problem. Everyone presents his idea in a

joint meeting and later all take a joint decision. For example, if they need chemical fertilizers, they decide how, where and when to provide the needed fertilizer. Cooperative members decide whether to borrow it from a local trader or ask the government to help them in this matter. Similarly, cooperative members decide about sourcing needed certified seeds, and required machinery such as tractors and threshers. In an interview Cooperative Member 6 from Kunduz province explained to the researcher the way they make joint decisions. He said:

*“Based on a specific issue we all cooperative members hold a meeting which all members attend. In this general meeting everyone discusses their problems that they face. During the discussion we list all the problems and make a joint decision about solving them. For example, if we need seeds or chemical fertilizer, we hold a general meeting and decide how/where to buy it and how to pay (i.e., cash, borrow, installment)” (Cooperative Member 6, September 21, 2018).*

### 3.7 Organization

Since the government is unable to organize and support farmers in agriculture-related activities and solve their problems in a war zone, creating a cooperative is a good option for farmers to extend their cooperation with each other and work together. A culture of caring is strong in cooperative which enables farmers to benefit and work together, help each other in the needed time, and reach pre-specified objectives determined in the cooperative statute. According to Cooperative Member 6 from Kunduz province, if a cooperative member observes a good harvest of a crop in a farm, the cooperative member will ask the owner of the farm to provide him with the same seed. Sometimes, the owner sells the seeds to the farmer but sometimes the owner asks for an exchange of the seeds with wheat grain. Farmers also exchange seeds with other inputs such as seeds with a chemical fertilizer if needed. To some extent, this exchanging and supportive (caring) relationship has enabled farmers (cooperative members) to continue production even during lack of extension services in a war zone.

*“If we need an input which we do not have, we ask it from another farmer that possess it. We usually exchange one input in return of another input with other farmers. For example, we get seeds from them but in return we give them chemical fertilizer or other inputs back as requested” (Cooperative Member 6, August 26, 2018).*

In addition to input exchange between farmers,

farmers also help each other in the transportation of their outputs. Since most of the farmers in a war zone are poor and do not have their own transportation, they get helped in supplying and selling their outputs in the market by other farmers owning the transportation. In this regard, Farmer 2 from Logar province added:

*“Sometimes if we cannot carry our output to market by ourselves, we ask our neighbor farmer who has vehicle to take [our produces] to market. He sells it in the market then return back our money. We usually help each other in this regard” (Farmer 2, September 3, 2018).*

Setting outputs or crops on fire (in the war between opposition sides) that is ready to be harvested is a frequent challenge farmer faces in a war zone. Mostly it happens due to war (fire exchange between government troops and Taliban). To prevent it, farmers usually help each other to reap, harvest, and thresh wheat on the same day. Farmer1 from Logar province further elaborated it:

*“This year we witnessed many farms got burnt in the war. To prevent it from happening, we ask our fellow farmers and relatives to help us in harvesting of the output. We try to finish harvesting and trashing our produces at same day. We call this process (Hashar)” (Farmer 1, September 3, 2018).*

### 3.8 Financial strength

Throughout four decades of war, the Afghan government has been relying on foreign aid to meet its financial needs. On the other hand, most of the financial resources are spent on the war and military sector, thus government cannot provide credit or loan services to farmers. Besides that, farmers' financial foundation is weak. Most of the farmers are poor and do not have money to buy the required inputs in the needed time. Therefore, when farmers need money to obtain and provide needed inputs for production, they usually borrow from their relatives and friends. This case is best described by Farmer 12 who is also a governmental staff in Kapisa province:

*“... government cannot provide us credit services, so we have to borrow from someone else (relatives, fellow farmers). Once we sold our livestock (e.g., cow, goat, sheep) or when my sons get paid, we pay back our loan” (Farmer 12, August 28, 2018).*

In addition to borrowing from relatives as mentioned by Farmer12, farmers also offer another solution (rearing and selling livestock) for their financial issues which to some extent enables farmers to obtain necessary inputs in needed time. In this regard, Farmer 5 from Panjshir stated that farmers usually rear livestock such as sheep,

cattle, and goats throughout the year and sell it when they need money (cash) or need to buy required inputs. He said:

*“Here most of the people (farmers) rear livestock throughout the year so when they need money to buy something (inputs), they sell their livestock [sheep, cow, bulls, and goat] and solve their financial problem through it...” (Farmer 5, August 26, 2018).*

Through rearing and selling livestock, farmers act independently and do not rely on the government for providing them credit services for buying agriculture equipment and inputs. If farmers do not have the above-mentioned alternatives for their financial issues, they borrow required inputs from local traders until harvesting time with a higher price compared to the current price of the market. Once farmers sold their outputs after harvesting and received money, they pay back the local traders. With respect to that, Farmer 5 from Logar said:

*“In current condition farmers do not have a financial source and they are under threats [financial problems]. Farmers cannot afford to buy seeds, pesticides and quality chemical fertilizer in needed time..... in such situations we borrow inputs from local traders. If the price for 7 kg of wheat crop seed is 150 AFG, they sell it 250 AFG to us till harvesting time. We return their money once we sold our output after the harvesting time. We buy the chemical fertilizer and other inputs same way” (Farmer 1, September 3, 2018).*

### 3.9 Adaptability

For survival purposes in a conflict zone, it is important for farmers to modify their agriculture practices in response to the existing challenges of war. Since most farmers do not have access to new technologies, they use traditional technologies and techniques in order to sustain their production-related operations and adapt to the existing situation in a war zone. Traditional technologies farmers use are such local varieties of the wheat crop, animal manure, and bulls to plough land and thrash wheat output once harvested. According to Farmer 12 from Kapisa province, during SUO farmers were using traditional technologies instead of modern technologies because they did not have access to it. He said:

*“During the Soviet Union time, there was no agriculture technologies such as improved seeds, chemical fertilizer and agriculture was not well developed. After the SUO time, agriculture developed a bit and nowadays people can proceed their lives better. During SUO, people was using traditional technology such as animal manure instead of chemical fertilizer,*

*local variety of wheat crop instead of improved seeds and they were using bulls instead of tractors to plough the land” (Farmer 12, August 28, 2018).*

Another farmer (Farmer 3) from Parwan province recalled his memory of the Taliban regime. According to him, sometimes due to a ban on chemical fertilizer, farmers were forced to cultivate wheat crops without using chemical fertilizers. He further said:

*“During the Taliban regime, they (Taliban) were blocking all the roads and were not allowing people to carry chemical fertilizer. When they were sizing it, they were pouring it into water stream. In that situation we were cultivating (crops) without chemical fertilizer. Sometimes we were using animal manure, but it was not enough. From the other hand animal manure cannot replace the chemical fertilizers” (Farmer 3, August 29, 2018).*

### 3.10 Security

Practising agriculture in a war zone is a very risky job. Therefore, most farmers cannot defend themselves against deliberate intrusion or attacks (danger, and war). Moreover, farmers have access restrictions to the field due to security reasons which do not allow farmers to freely work on their farms and have access to markets. In other words, farmers cannot travel to farms to cultivate, irrigate, weed, control diseases, and harvest their produce on time because if they do so, they may get killed or get injured. To avoid unnecessary harm and causality, farmers delay their farming practices until the danger (war) ends. When recalling SUO, Farmer 5 from Panjshir province summarized this scenario as follows:

*“In war zone, due to the existing risk of war, farmers cannot go to the farmlands and cannot proceed farming activities such as irrigation, cultivation, and harvesting. They have fear that something may happen to them. To avoid causality, we delay farming activities in such condition for some time”.*

Since the government is unable to provide security in a war zone, thus, farmers have to guard and protect their farms and assets themselves. To protect their assets, most of the time farmers take action themselves. Since farmers' financial condition is not good to employ a guard in order to protect their farms and assets, farmers do it themselves. If needed sometimes farmers take their guns to protect their farms and property/equipment themselves. A cooperative member from Kunduz province elaborated this further:

*“He (local police commander) asked money from me, when I declined his request, he attacked my home and storage with machine guns and rocket launcher...”*



*He was a local police (Arbakai) commander. He asked for money, I said I do not have. He pointed out to the cooperative property. I told him that it is not my property. It belongs to 500 to 600 members of the cooperative association... so our relationship got worsen and then he attacked me [his home] with rockets. I complained to local government... they said we cannot control him because he is an insurgent person and you should defend yourself by yourself .... Then I bought guns, and I was guarding my property for some years. Later he died with his friends (Cooperative Member 6, September 21, 2018).*

To protect their equipment, sometimes farmers carry their valuable equipment into peaceful places. To further enlighten it, Cooperative Member 6 shared his story of when his cooperative was attacked in the war between Taliban and government forces in Kunduz province. In the attack, some of the cooperative's equipment and machinery got destroyed and the rest of them was safely transferred to and kept inside another cooperative located in Kunduz city. He further said:

*"Few years ago, our cooperative was the center of an armed clash between Taliban and governmental troops. Some of the equipment destroyed but we transferred the remained equipment to Kunduz city where we now keep it in a dairy cooperative which has security guards" (Cooperative Member 6, September 21, 2018).*

#### 4. Discussion

The current study found that wheat crop industry actors (cooperative members, extension officers, and farmers) demonstrate resilience in a war zone by utilizing some of the relevant capabilities in extension service delivery, wheat crop production and its trading, which are further discussed below.

Flexibility in sourcing is a capability farmers possess in a war zone which enables them to withstand shortage of agricultural inputs in needed time. Flexibility has been defined as "being able to bend easily without breaking" and has thus been defined as an essential component of resilience (Peck, 2006). Flexibility ensures that the supply chain can absorb changes induced by the risk event through appropriate responses (Skipper and Hanna, 2009). As a result, it is the ability to deal with, resolve, and, when necessary, exploit unanticipated emergencies (Jüttner and Maklan, 2011). Flexibility in sourcing "is the ability to quickly change inputs or the mode of receiving inputs" (Pettit *et al.*, 2010). In the context of a war zone, flexibility in sourcing can be found through the existence of multiple uses and multiple sources sub-constructs. In a war zone, flexibility in sourcing explains

the cultivation of one variety of seeds many times (for many years/seasons), using traditional technologies (local seeds, and animal manure) and sourcing inputs from multiple sources such as markets, local traders and fellow farmers. Even though farmers often do not have access to the inputs market in a war zone, they show resilience through multiple usages of inputs and multi-sourcing the agriculture inputs (seeds, and fertilizers). For example, they use one variety of seeds for many years/seasons if they cannot receive improved seeds from the agriculture department or are not able to buy improved seeds from the market. Since the extension relationship between farmers and extension agents is weak and farmers cannot access the inputs market in a war zone, farmers found an alternative survival mechanism by supplying each other with agriculture inputs (e.g. high yield seeds) instead. For example, a farmer borrows seeds, fertilizers, and money from other farmers or assists each other in cultivation and harvesting.

Having the capacity for continuous production is of importance for wheat crop farmers in a war zone. It enables farmers to produce and supply agricultural produce to market continuously and off-season. It has been defined by Pettit *et al.* (2010) as the "availability of assets to enable sustained production levels". The study revealed that the capability of capacity can be seen through the existence of communication and reserve capacity sub-constructs in a war zone. In a war zone context, capacity concerns more about good/effective communication between farmers and extension officers and building new storage for farmers. This research supports the findings of Pettit *et al.* (2013), which showed that a lack of additional capacity was a major worry for the companies he investigated. Sharing on-time information with farmers regarding new technologies and agriculture practices, and building new storage enables farmers to produce in a war zone.

Efficiency or proper utilization of assets (production resources/inputs) is important for all farmers, particularly those living in a war zone. Farmers are able to produce more with efficient usage of agriculture inputs. Performance with minimal resource use is defined as efficiency (Fiksel, 2003). Pettit *et al.* (2010) define efficiency as the capability to create outputs with minimal resource requirements. This study revealed that efficiency is more related to the proper use of farmland in a war zone. It means that farmers select crops for cultivation that produce more in a specific texture of the soil. This increases the output and income of farmers living in a war zone. It also found that due to practicing traditional agriculture and the use of traditional agriculture technologies (local varieties of wheat crops,

and usage of animal manure instead of chemical fertilizers), farmers show less capability through the construct of efficiency.

Construct of visibility is defined by Pettit *et al.* (2010) as “the knowledge of the status of operating assets and the environment”. Based on the definition made by Pettit *et al.* (2010), it is important for farmers in a war zone to have good knowledge regarding agriculture inputs in order to produce more. Brandon-Jones *et al.* (2014) discovered that visibility is a significant antecedent to risk decrease because it not only allows organizations to track products and identify potential disruptions but also because its absence can establish new hazards. Brandon-Jones *et al.* (2014) assert that visibility is viewed as a broader capability that captures material and information flows. In a war zone, farmers show visibility capability by understanding the status of some of their inputs (assets) by observing and experimenting with the inputs i.e., high-quality and low-quality seeds and exchanging their experiences with each other related to input. Having better knowledge from agriculture farms and sharing related information/experiences enables farmers to produce more and learn new things regarding farming.

Anticipating future events is the duty of the government but unfortunately, four decades of long-lasting war has adversely affected this capability of Afghanistan’s government. Therefore, the government is not able to effectively anticipate future events that harm farmers, particularly those involved in wheat crop production in a war zone. Before the SUO, Afghanistan had many stations for weather forecasting across the country and was providing farmers with reliable and on-time information, but decades of war destroyed all of them. In addition to the sudden escalation of the war, harsh weather conditions and unawareness about it, affect farmers’ production in a war zone. “Anticipation is an ability to discern potential future events or situations” (Pettit *et al.*, 2010). Anticipation is defined by Wieland and Wallenburg (2013) as a forecast of possible future changes. The results of this study determined that the construct of anticipation can be understood from the existence of a forecasting sub-construct in a war zone. In a war zone, anticipation is perceived as using past experiences in order to discern future dangers (war and natural hazards). Findings show that based on the past experiences, sometimes farmers are able to forecast future events such as escalation of conflict in some area but in most cases, war shows high uncertainty for the farmers which makes them unable to set any type of planning thus making them practice subsistence agriculture (live day to day rather than making short- and long-term plan).

Dispersion is the “broad distribution or decentralization of assets” (Pettit *et al.*, 2010). This study found that centralization in resources/assets make farmers more resilient and enables them to survive better in a war zone rather than the decentralization of resources/assets as suggested by Pettit. The majority of farmers in Afghanistan are smallholders and possess less than of two hectares of irrigated farmland (Pervez *et al.*, 2014). Thus, they do not have much (assets i.e., farmland) to distribute or decentralize amongst family members. Instead of decentralization of assets among family members, farmers involve their family members in farming activities as well as in decision making.

The organization of the farmers enable them to help each other in crisis situations in a war zone. It has been defined by Pettit *et al.* (2010) as “the organization of human resource structure, policies, skills and culture”. In this study, farmers reported the capability of the organization through the existence of a culture of caring which is facilitated by grouping together in cooperatives. In the context of this study, organizations describe the exchange of agriculture inputs (seeds, fertilizer, etc.) amongst farmers and helping each other in farming-related activities which make farmers less reliant on extension services in a war zone. In addition, to inputs exchange, farmers even help each other in accomplishing farming activities such as cultivation, irrigation, and harvesting. Since the relationship between farmers and extension officers is poor in a war zone, farmers especially cooperative members support each other to be less reliant on the department of agriculture. Cooperative members have a strong bond with each other, and this has enabled them to withstand harsh conditions such as war and shortage of inputs.

Financial strength or having enough financial resources to buy required agriculture inputs in needed time has a significant role in the development of agriculture in a war zone. Financial strength is “the capacity to absorb fluctuations in cash flow” (Pettit *et al.*, 2010). Throughout four decades of war, the Afghan government has been relying on outside sources to meet its financial needs. During wartime most of the financial resources are spent on the war and military sector, thus the government cannot provide credit/loan and insurance services to meet farmers’ financial needs. This is supported by the findings of Blattman and Miguel (2010), Rockmore (2015), and Verpoorten (2009). Their findings increasingly propose that war has a negative impact on agricultural production due to a lack of credit. Regarding farmers’ capabilities in providing financial sources for themselves, this study’s findings are aligned with the findings of Pettit *et al.* (2013). Pettit found that firms in his study reported capability strength in the area

of financial strength. The study revealed that farmers in war zone show resilience in the provision of needed financial resources for themselves. To buy needed inputs, farmers are borrowing money from their relatives. In addition, farmers borrow required inputs at higher prices compared to the normal price of the market from local traders until harvesting time. Once farmers harvested their produce and sold it, they pay the local traders back. Moreover, farmers rear livestock such as sheep, cattle, and goats throughout the year and sell them when they need money (cash) or need to buy required inputs. All of these help farmers to continue production in lack of financial resources and be less reliant on the government for providing credit services.

In order to produce in war conditions, farmers should have the capacity of adaptability in a war zone. In other words, farmers should be able to adapt to the war conditions and continue production. The ability to change in response to new pressures is referred to as adaptability (Fiksel, 2003). Pettit *et al.* (2010) referred to adaptability as the “ability to modify operations in response to challenges or opportunities”. Results of this study disclosed that farmers show the capability of adaptability in their agriculture practices through the usage of alternative technology in a war zone. For survival purposes in a war zone, it is important for farmers to change their operations in response to the existing challenges of war. Since farmers in the war zone do not have access to new technologies, to sustain their production-related operations and adapt to the existing situation, they usually use local technologies such as local varieties of the wheat crop instead of certified seeds, animal manure instead of chemical fertilizers, and bulls instead of a tractor. These strategies have enabled them to sustain production even during the lack of new and improved technologies.

For production purposes, security is as much important as other production factors. Security and farmers’ safety encourage farmers to work hard and produce more. “Security is the defense against deliberate intrusion or attack” (Pettit *et al.*, 2010). Farmers secure their self and asset through access restrictions and employee involvement in a war zone. To prevent casualties in war, farmers postpone farming-related activities (cultivation, irrigation, harvesting) which avoid human casualties and farmer migration to other areas. The findings also revealed that in needed time farmers take guns to protect themselves and their assets.

## 5. Conclusion

This study provides a glimpse of the capabilities that wheat crop farmers possess in the war zone. This study

found that ten out of fourteen main factors and fourteen sub-factors of capability construct are applicable in the war zone which enable farmers to withstand war conditions/vulnerabilities and retain practicing agriculture activities. However, constructs of flexibility in order fulfilment, collaboration, recovery, and market position were not applicable in the war zone where data was collected.

Through the findings of this study, the department of agriculture is advised to extend extension services to farmers to control land related problems and plant diseases in areas affected by war. The agriculture ministry must provide subsidies of inputs, advanced/new agriculture technologies and farming machineries to farmers. Further, credit services should be provided in order to enable farmers to purchase required inputs in time. This will prevent farmers from abandoning their farms and subsequently prevent labor shortage in the agriculture sector of affected areas. The agriculture ministry should help farmers in accessing output market. The government should also build standard and underground storages in order to enable farmers to preserve their produce during wartime and off-season particularly when output price is lower in the market. Lastly, establishing farmers’ cooperative is recommended which enables farmers to be well organized, and act independently in solving their problems in areas affected by war.

## Conflict of interest

The authors declare no conflict of interest.

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