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Conference Paper
Predicting Farmers Uptake of Spineless Cactus in the Arabian Peninsula: A case study of Qatar

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ICARDA
Science for resilient livelihoods in dry areas

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INTRODUCTION

- **Framework:** **the ICARDA-APRP project "Improving food security and sustainable natural resources management through enhancing integrated agricultural production systems in the Arabian Peninsula"**
- **Focus:** **the need to ascertain whether spineless cactus (SC) technology is relevant as alternative means to improve the availability of less water consuming forage crops in Qatar**

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INTRODUCTION

- **Livestock production, particularly meat and milk from sheep and goats, is essential in the region from a cultural and food security point of view**
- **Ensuring and maintaining a reliable source of animal feed is a necessity especially under the predicted water scarcity**
- **Spineless cactus is being considered as climate smart forage crop and an innovative agricultural technology package introduced in the Arabian Peninsula since 2007**

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INTRODUCTION

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Goals:

- **Level of adoption evaluation - from farmers perspective, with special emphasis on the main factors affecting and limiting the adoption process in Qatar farming system context.**
- **Assessment of the basic criteria and the perception on the adoption of SC crop with the Qatari national research and extension system:**
  - **to better understand the existing farming systems and farming communities**
  - **To quantify the number of users for this innovation over time to assess impacts or determine extension requirements**
- **To identify the main constraints (technical, socioeconomic, environmental, social, cultural, institutional, political, etc.) and working on sustainable solutions**

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MATERIALS AND METHODS

Adoption and diffusion outcome prediction tool (ADOPT)

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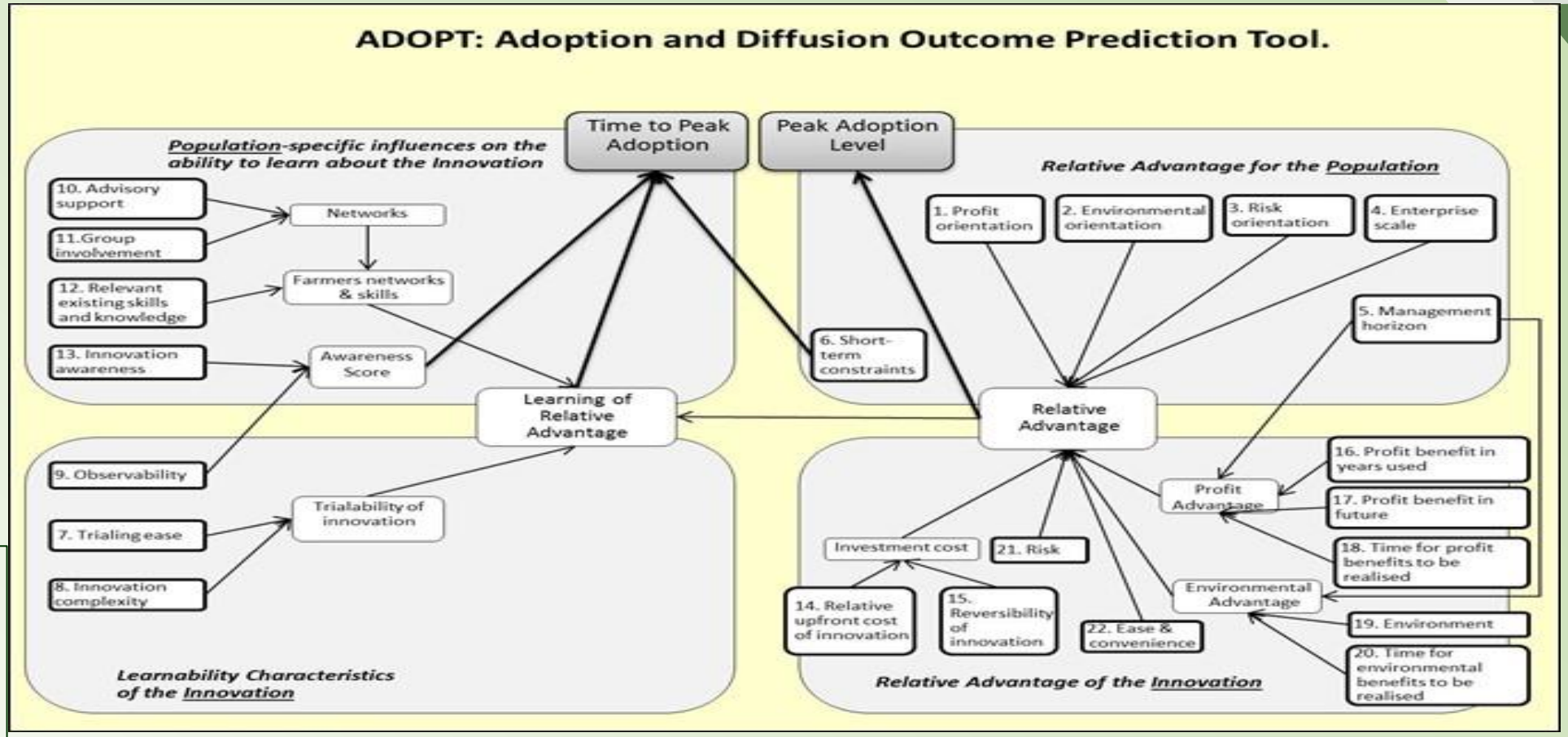

Source:http://aciar.gov.au/files/node/13992/adopt_a_tool_for_evaluating_adoptability_of_agric_94588.pdf

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MATERIALS AND METHODS

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Likert-type scale

- **A 6-point Likert scale (LS) was used**
- **Descriptive statistics and reliabilities scores were calculated for each scale of the technology characteristics item**
- **A composite index has been calculated for measuring the stakeholder's perceptions of this agricultural innovation**
- **Evaluated technologies characteristics: divisibility of the technology; compatibility of the technology; communicability of the technology; easy to follow up; easy to implement; environmental benefits; reduce risk; increase profit; reduce costs; affordability of the technology; complexity of the technology; if the technology need skills know**

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MATERIALS AND METHODS

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Data sources

Data for the ADOPT's implementation

- **Focus Group Discussion with 20 farmers**
- **22 discussion questions and four categories: (i) characteristics of the innovation, (ii) characteristics of the target population, (iii) relative advantage of using the innovation, and (iv) learning of the relative advantage of the innovation**

Data for the Likert scale tool's implementation

- **A survey response using scale categories**
- **"7" respondents (national researchers and extension agents)**

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RESULTS AND DISCUSSION

- **Qatari farmers believed that the SC technology is beneficial for them because it fits well with their environmental and socio-demographic conditions**
- **They prefer this technology because of its little use of inputs and its flexibility**
- **They expect to have more knowledge and know-how through a more efficient extension system, mainly the technical and commercial aspects of the innovation**

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RESULTS AND DISCUSSION

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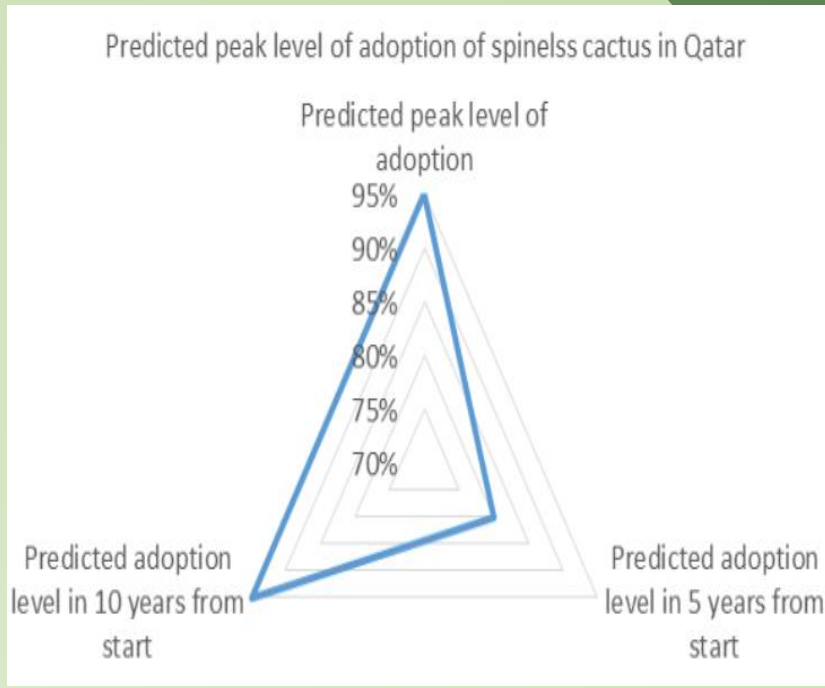
Prediction of adoption levels and factors affecting the adoption of SC innovation

- **The peak adoption rate for the adoption of spineless cactus in Qatar is predicted to be 95% after a period of 9.4 years.**
- **The expected adoption level in 5 and 10 years from the starting period on the adoption of this technology is 80 and 90%**
- **Factors such as farmers' profit, environmental and risk orientations, the number of farmers expected to benefit from the innovations, the ecological and profit advantages, the ease of implementation and use, determine the high level of peak adoption**



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- **Factors such as the farmer's skills and networks, the innovation's trialability and the relative advantage make up the population's ability to learn about the innovations, determine the time to peak adoption**

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RESULTS AND DISCUSSION

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Essential criteria and assessment of SC innovation for adoption decision

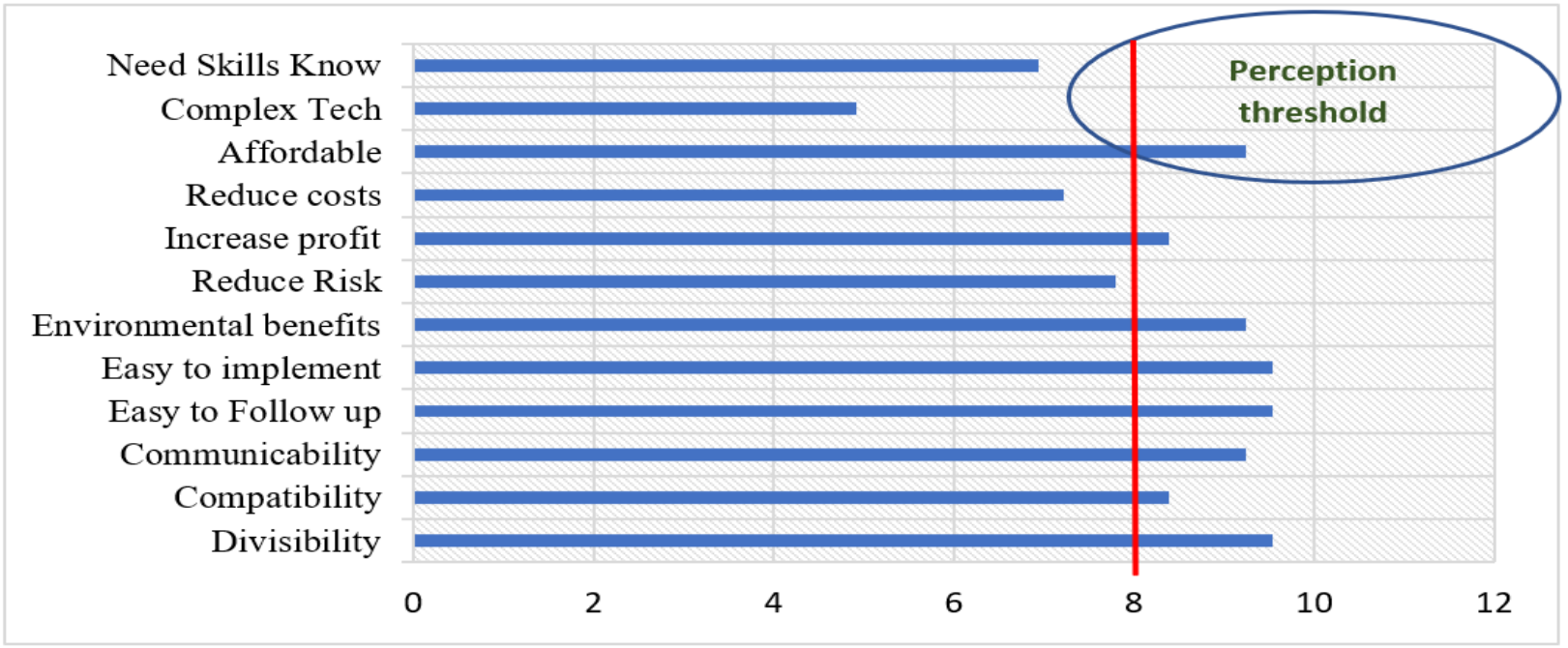

Figure 3. Spineless cactus technology assessment weight between GCC countries.
Note: F=26.80; df (Between groups=6); p-value ≤0.05.
Source: Own elaboration from survey data (2021).

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RESULTS AND DISCUSSION

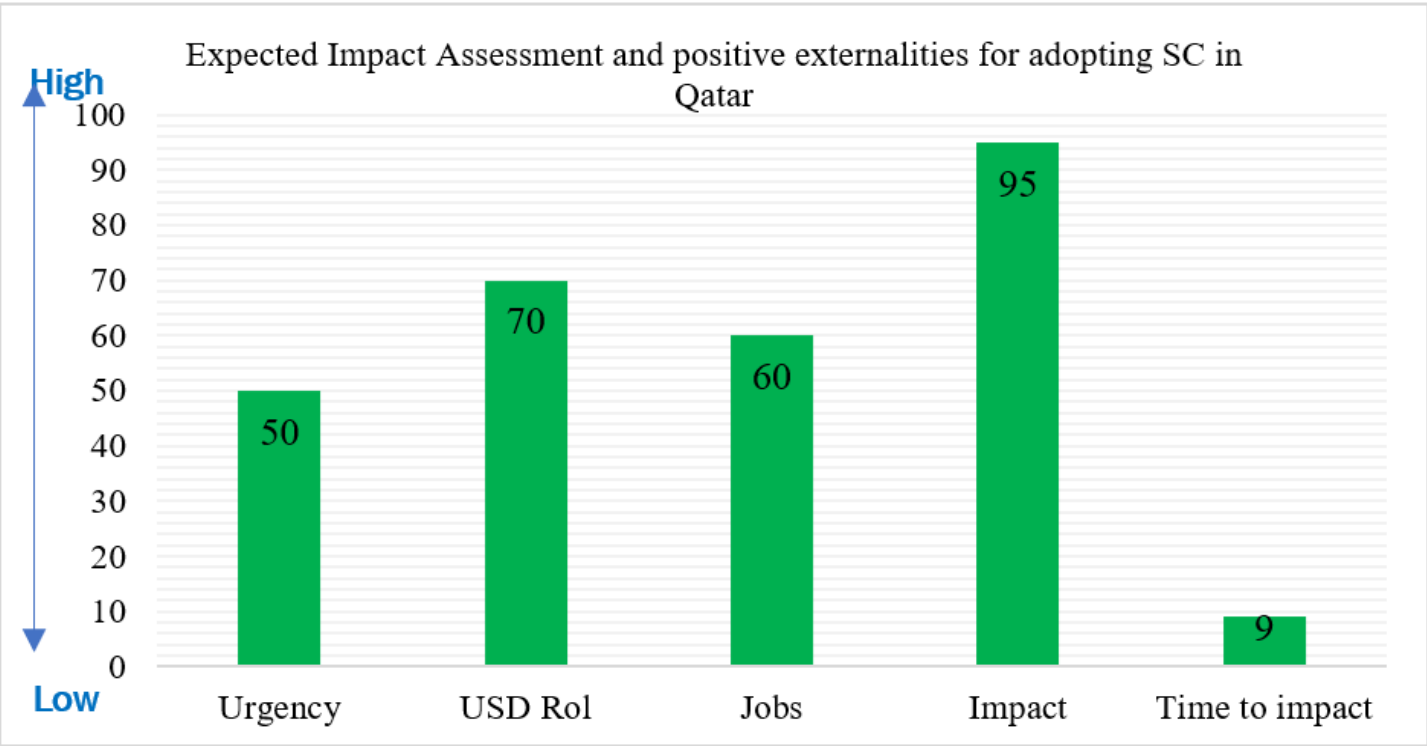

Figure 4. Net stacked distribution of the concerns over twelve major characteristics of the spineless cactus technology.
Note: F=11.54; df (Between groups=11); p-value ≤0.05.
Source: Own elaboration from survey data (2021).

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RESULTS AND DISCUSSION

Expected impact assessment and positive externalities for adopting SC innovation in Qatar

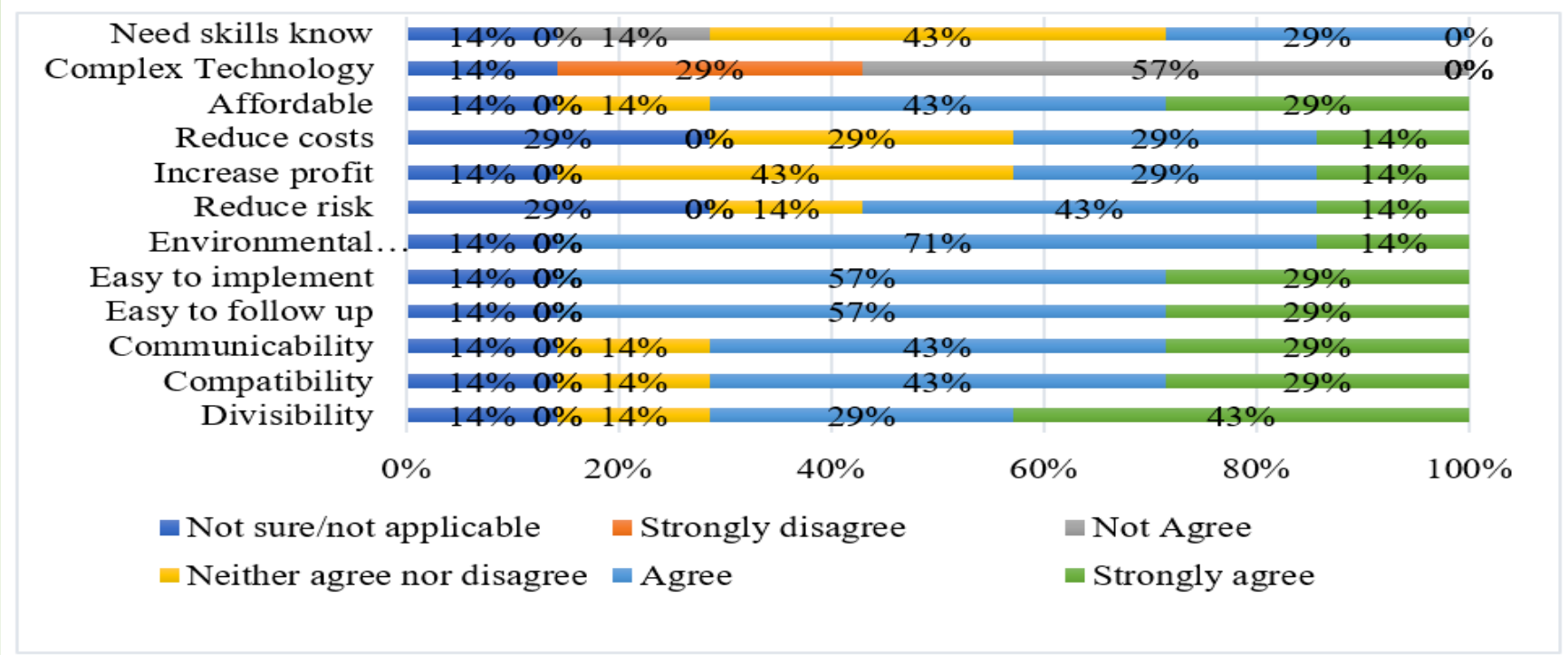

Figure 5. The road to value: Spineless cactus (SC).
Note: F=146.65; df (Between groups=4); p-value ≤0.05.
Source: Own elaboration from survey data (2021).

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CONCLUDING REMARKS

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- **The level of peak adoption of the innovation is relatively high**
- **Technical assistance, important new skills and knowledge and effective extension advisory services are the main positive driving factors influencing the adoption of the SC technology**
- **The key constraining factors for this peak level of adoption are farmers' profit, environmental and risk orientations, the number of farmers expected to benefit from the innovation, the ecological and profit advantages, the ease and convenience of implementation and use**
- **There is a positive perception of this technology's characteristics from the national researchers and extension agents, which could influence both its diffusion and adoption**

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CONCLUDING REMARKS

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- **The influence of characteristics of the technology proved to be essential for farmers' decision-making on adopting this technology: (Relevance of this technology in Qatar and similar agro-ecological contexts)**
- **In APRP the focus on SC was only as less water consuming forage**
- **Valuing (valorizing) the other multi-uses of the plant (fruit, cosmetics, pharmaceutical and medicinal, seed oils, ...) may have significantly much better return and enhance its adoption by farmers/investors accordingly.**

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POLICY IMPLICATIONS

- **There is a need to develop an integrated production system for SC to face high water requirements for other forages species**
- **The establishment of technology characteristics relationship and adoption will allow decision-makers and planners in R&D to determine and target which characteristics of new technology led to their easy transfer and diffusion among the Qatari farmers**

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POLICY IMPLICATIONS

- **There is a need for a more significant political and institutional input into this technology, mainly through:**
  - **the development of demonstration sites and enhancing farmers' field schools (FFS's)**
  - **the potential (economic and environmental) benefits confirmation of this technology as a sustainable feed resource in such a country characterized by a very harsh environment and a shortage in livestock feed resources.**

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CREDITS & ACKNOWLEDGMENTS

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Disclaimers

- *(1) The views expressed in this presentation are the authors' own and do not necessarily reflect ICARDA, Ministry of Municipality and Environment of Qatar, KFAED, AFESD, CGIAR or any involved research and development partners in this research program*
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THANK YOU

Comments – Questions

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