

Tracing and Construction Spatial Relationships between Actors in Date Palm Farming Economy; Climate Adaptation of Date Palms in Makkoran Area

Hadi Rasti

PhD Candidate in Geography and Rural Planning, Faculty of Geographical Sciences and Planning, University of Isfahan, Isfahan, Iran

Seyyed Eskandar Seidiy¹

Associate Professor in Geography and Rural Planning, Faculty of Geographical Sciences and Planning, University of Isfahan, Isfahan, Iran

Hamid Barghi

Associate Professor in Geography and Rural Planning, Faculty of Geographical Sciences and Planning, University of Isfahan, Isfahan, Iran

Faramarz Barimani

Professor in Department of Geography, Faculty of Humanities and Social Sciences, University of Mazandaran, Babolsar, Iran

Received: 21 May 2019

Accepted: 1 October 2019

Extended abstract

1. Introduction

The agricultural sector in the less developed countries on a national and regional scale affected by the national, regional and global economy, facing many challenges in terms of its functioning. This issue has limited food security and local and national development because agriculture in the marginalized and deprived areas of these countries is often of a kind of retail and traditional agriculture. Therefore, understanding the nature and dynamism of the rural and marginal areas of the less-developed countries, which are heavily influenced by several factors, including ecological conditions, not only requires awareness of environmental and structural changes, but also requires awareness of the effects of decision-making institutions and the spatial changes resulting from it. In less developed countries, including Iran, low productivity and low yield factors are considered the main challenges facing agricultural sector. One of the major challenges affecting the production function, especially in the field of date palm gardening, is the ecological and climatic conditions. Such a condition cannot be disrupted by human actions. Makkoran Area is climatically located in a dry, warm and very hot desert area with special conditions of rain (monsoon rainfall). Palm tree farming activities in this area faces many challenges, particularly in terms of adaptation to the climate. The present study seeks to trace and construct spatial relationships (networks) involved in the climate adaptation of date palms and emphasize its functional development in order to develop local economy in Makkoran Area of Iran.

1. Corresponding Author, Email: s.seidiy@geo.ui.ac.ir

2. Review of Literature

Previous researches have examined production efficiency in date palm gardening often in two dimensions. Some have examined production efficiency related to structural and human factors (such as institutional barriers to achieving subsidies, access to agricultural services, production costs, etc.) and few studies have examined the distribution of date palm trees and the possibility of its economic production under the influence of climate change.

Lutfi (2010) examined the effect of production performance on date palm trees productivity in Egypt, Saudi Arabia, UAE, Oman, Tunisia and Iraq, and showed that replacing them with high-quality cultivars is one of the main problems in reducing date palm productivity. Al-Abbad, Al-Jamal, Al-Alawi, Al-Sharid and Belifa (2011) investigated the economic feasibility of date palm trees cultivation in Saudi Arabia. They argued institutional barriers for accessing subsidies as a major threat. Shabani, Kumar and Taylor (2012) probed the effect of climate change on the distribution of date palms in the world and based on the results, some countries and regions such as Saudi Arabia, Iraq and southwestern Iran will face restrictions in the future in terms of date palm trees climate adaptation.

But so far no study has investigated how the spatial relationships between actors (human and inhuman) shape the date palm economy especially in the production sector and how it is possible to define the climate adaptation mechanism of date palm via a relational (network) approach. Therefore this issue is strongly felt in Iran especially in economic agricultural and geographical studies.

In the present study, the actor-network theory is considered as a theoretical framework. The main theme of the actor-network theory is that the action of the combination of human beings and non-human substances in a network is created. This means that the theory combines all (human and non-human) actors and denies purely social, technical, or purely natural affinities. It deals with the detection and tracking of links between a variety of actors (human, non-human, material, and discursive) that allows actors, events and processes to emerge as they are. Nowadays researchers, including geographers, follow a similar path that tracks heterogeneous strings of things to understand the construction of the social within the public. Instead of a social actor, this theory focuses on the social and material world in which the social-material actor is called the actant, and instead of a stable network with nodes, it shows the fluidity and unpredictability of the cohabitation of actors who have adopted the intellectual root of Deleuze.

3. Method

This research was conducted based on a mixed-methods (sequential strategy-variable) approach. The statistical population consisted of 17493 exploiters of date palms in the villages of Makkoran Area. The purposive-probabilistic method was used for sampling. For determining the sample size at the qualitative stage, the "adequacy of information" criterion and in the quantitative stage, the "representativeness" criterion was employed via the Cochran formula. Sample size at the qualitative stage was 111 exploiters of date palms and 16 experts. In the quantitative phase, 376 exploiters of date palms and 32 experts answered the

quantitative questionnaire. The type of mixed analysis in the study is “the mixed-methods sequential explanatory analysis” based on a qualitative-quantitative strategy. Qualitative data were analyzed using "NVIVO" software, and quantitative data with statistical methods in SPSS software environment. In the final stage, analysis and inference of data were done according to Latour's (1987) arguments of the "translation" method.

4. Results and Discussion

Findings showed that there are complex and multi-faceted spatial relationships occur between human and non-human actors regarding the climate adaptation of date palm trees. In this regard, the geographic location and climatic actors are restrictive actors and barriers for the adaptation of indigenous date palm types are beneficial actors and provide favorable conditions for the production of dates.

Also, these restricting actors are involved with other varieties of date palms (non-indigenous types) and mediated by the exploiter and the government (the Agricultural Jihad Organization) has become capable or opportunity-constructing actors. In other words, date palms, as a key actor due to geographical location and climate action, both restricts and provides conditions for the emergence of newer opportunities (the cultivation of new, compatible and exportable types). Hence, each one of the actors has a force field that influences the other and takes action on other or resist against other's action in the form of pressure and reaction of date palms' climate adaptability. Therefore, date palms have multi-faceted and reciprocal power relations in terms of pressure-resistance concept with geographic location (latitude and longitude) and climatic actors, which are mediated by exploiters, economy, government, land, and water.

5. Conclusion

Among the actors of the geographical and climatic location, the relative humidity, altitude, latitude, temperature, rainfall, intensity of the solar radiation, and longitude have a wider and stronger spatial network and, as main determinants play roles in climate adaptation of date palms. Other climate actors, such as evapotranspiration, monsoon flows, and wind speed are also less restricting and weaker in spatial relationships. Therefore, spatial relationships between actors showed that date palms, exploiters, climate, geographic location, government (the Agricultural Jihad Organization), water, capital, and land are key actors in the adaptability of date palms, respectively.

Keywords: Spatial Relations, Actors (Human and Non-Human), Date Palms, Makkoran Area

References (In Persian)

1. Ghaffari, A., Ghasemi, & Depao, A. (2015). پهنه‌بندی اقلیم کشاورزی ایران با استفاده از روش یونسکو [The zoning of the agricultural climate in Iran using the UNESCO method]. *Iranian Journal of Dry Farming*, 4(1), 63-95.

2. Institute of Forestry and Rangelands of the Country. (2015). تعیین قلمرو جغرافیایی محدوده‌های بیابانی ایران [Determination of the geographic territory of desert ranges of Iran]. Tehran: Publications of the Research Organization, Education and Promotion of Agriculture.
3. Jihad Agriculture Organization of Sistan and Baluchistan Province. (2016). سالنامه آماری کشاورزی (کشاورزی) [Agricultural statistical yearbook]. Tehran, Iran: Statistics Center of Iran.
4. Mehdizadeh, M., & Tavakkol, M. (2007). مطالعات علم و فناوری: مروری بر زمینه‌های [Science and technology studies: A review of the fields of technology sociology]. *Journal of Plans and Budgets*, 12(105), 85-124.
5. Ministry of Agriculture Jihad. (2016). سالنامه آماری کشاورزی. [Agricultural Statistical Yearbook].
6. Najjar Saligheh, M. (2006). مکانیزم‌های بارش در جنوب شرق کشور. [Precipitation mechanisms in the southeast of Iran]. *Journal of Geographical Research*, 2(55), 1-13.
7. Pishro, H., Mahdavi, M., & Azizi, P. (2010). نقش نخیلات در توسعه پایدار روستایی شهرستان دشتستان [The role of humans in sustainable rural development in Dashtestan (focusing on economic dimensions)]. *Journal of New Attitudes in Human Geography*, 2(3), 145-163.
8. Poudineh, A., Delbari, M., Haghigatjou, P., & Amiri, M. (2015). تحلیل مکانی تغییرات بارش با در نظر گرفتن متغیرهای ارتفاع و فاصله تا دریا (مورد مطالعه: استان سیستان و بلوچستان) [Spatial analysis of rainfall changes by considering the variables of altitude and distance from the sea (Case study: Sistan and Baluchestan Province)]. *Journal of Research on Natural Geography*, 47(4), 607-636.
9. Saligheh, M., Barimani, F., & Esmailnejad, M. (2008). پهنه‌بندی اقلیمی استان سیستان و بلوچستان [Climatic zoning of Sistan and Baluchestan province]. *Journal of Geography and Development*, 6(12), 101-116.
10. Sharifzadeh, R., & Mogahdam Haydari, Gh. (2015). از ساخت اجتماعی معرفت تا [From social creation to knowledge to the collective creation of reality: Latour vs. Bleurs]. *Journal of Methodology of Humanities*, 21(83), 93-120.
11. Shoorcheh, M. (2017). مکتب‌های جغرافیایی [Geographical schools] Tehran: Parham-Naghsh Press.
12. Singh, J., & Dillon, A. (1995). جغرافیای کشاورزی [Agricultural geography] (S. Dehghanian, A. Kuchiki, & A. Kolahi Ahari, Trans.). Mashhad, Iran: Ferdowsi University of Mashhad Press.

13. Woods, M. (2011). جغرافیای روستایی (فرایندها، واکنش‌ها و تجربه‌های بازساخت [Rural geography (rural rehabilitation processes, reactions and experiences)] (M. R. Rezvani, & Sarmat Farhadi, Trans.). Tehran, Iran: Tehran University Press.

References (In English)

1. AL-Abbad, A., Al-Jamal, M., Al-Elaiwi, Z., Al-Shreed, F., and Belaifa, H. (2011). A study on the economic feasibility of date palm cultivation in the Al-Hassa Oasis of Saudi Arabia. *Journal of Development and Agricultural Economics*, 3(9), 463-468.
2. Bosco, F. J. (2006). Actor-network theory, networks and relational approaches in human geography. In S. Aiken, & G. Valentine (Eds.), *Approaches to human geography* (pp. 136-46). London, England: Sage.
3. Callon, M., & Latour, B. (1981). Unscrewing the big Leviathan: how actors macrostructure reality and how sociologists help them to do so. In K. Knorr-Cetina, & A. Cicourel (Eds.), *Advances in social theory: Towards an integration of Micro- and Macrosociologies* (pp. 277-303). London, England: Routledge and Kegan Paul.
4. FAO. (2002). *Reporting the agricultural economy*. New York, NY: United Nations.
5. FAO. (2012). *Reporting the agricultural economy*. New York, NY: United Nations.
6. FAO. (2014). *Reporting the agricultural economy*. New York, NY: United Nations.
7. FAO. (2016). *Reporting the agricultural economy*. New York, NY: United Nations.
8. Harvey, D. (1996). *Justice, nature and the geography of difference*. Oxford, England: Blackwell.
9. Latour, B. (1987). *Science in action*. Milton Keynes: Open University Press.
10. Latour, B. (1988). *The pasteurization of France*. Cambridge, MA: Harvard University Press.
11. Latour, B. (1993). *We have never been modern*. Cambridge, MA: Harvard University Press.
12. Latour, B. (1996). On actor-network theory: A few clarifications. *Soziale Welt* 4(47), 369-381.
13. Latour, B. (1999). *Pandora's hope*. London: Harvard University Press.
14. Loutfy I. (2010). Degradation of date palm trees and date production in Arab countries: Causes and potential rehabilitation. *Australian Journal of Basic and Applied Sciences*, 4(8), 3998-4010.
15. Muller, M. (2015). A half-hearted romance? A diagnosis and agenda for the relationship between economic geography and actor-network theory (ANT). *Progress in Human Geography*, 39(1), 65-86.
16. Muller, M., & Schurr, C. (2016). Assemblage thinking and actor-network theory: Conjunctions, disjunctions, *Transactions of the Institute of British Geographers* 41(3), 217-229.

17. Mumtaz Baloch, A., & Gopal Thapa, B. (2014). Agricultural extension in Balochistan, Pakistan: Date palm farmers' access and satisfaction. *Journal of Mountain Science*, 11(4), 1035-1048.
18. Murdoch, J. (2006). *Post-structuralist geography: A guide to relational space*. London, England: SAGE.
19. Ruming, K. (2009). Following the Actors: Mobilising an actor-network theory methodology in geography. *Journal of Australian Geographer*, 40(4), 451-469.
20. Shabani, F., Cacho, O & Kumar, L. (2016). Effects of climate change on economic feasibility of future date palm production: An integrated assessment in Iran. *Journal of Human and Ecological Risk Assessment*, 22(5), 1268-1287.
21. Shabani, F., Kumar, L., & Taylor, S. (2012). Climate change impacts on the future distribution of date palms: A modeling exercise using CLIMEX. *Journal of PLoS One*, 7(10), 1-12.
22. Shabani, F., Kumar, L., & Taylor, S. (2014). Projecting date palm distribution in Iran under climate change using topography, physicochemical soil properties, soil taxonomy, land use, and climate data. *Theoretical and Applied Climatology*, 118 (3), 553–567.

How to cite this article:

Rasti, H., Seidiy, S. E., Barghi, H., & Barimani, F. (2020). Tracing and construction spatial relationships between actors in date palm farming economy; climate adaptation of date palms in Makkoran Area. *Journal of Geography and Regional Development*, 17(2), 259-292.

URL <http://jgrd.um.ac.ir/index.php/geography/article/view/80828>