Environmental Science & Policy 68 (2017) 10–19

Contents lists available at ScienceDirect

Environmental Science & Policy

journal homepage: www.elsevier.com/locate/envsci

Adaptation of Russian agriculture to climatic variability: The role of federal and provincial policies

Nataliya Stupak

Humboldt University Berlin, Albrecht Daniel Thaer-Institute of Agricultural and Horticultural Sciences, Division of Resource Economics, Hannoversche Str. 27, D-10115 Berlin, Germany

ARTICLE INFO

Article history:
Received 20 May 2016
Received in revised form 20 October 2016
Accepted 20 October 2016
Available online xxx

Keywords:
Climate variability
Agriculture
Climate change adaptation
Agricultural policy
Russian Federation

ABSTRACT

This paper draws on the example of Tyumen Province, a federal subject of the Russian Federation, to explore the role that policies play in hindering agricultural producers' adaptation to climate change. Its objective is to contribute to a better understanding of maladaptation at the policy level. The discourse analysis method is used to explain perceptions of climate variability in Tyumen Province and its impact on agriculture. The document analysis method is used to assess agricultural policy in Tyumen Province and its implications for producers' adaptation to climate change. The results suggest that although agricultural producers and policymakers are acutely aware both of climate variability and the resulting loss of agricultural output, provincial agricultural policy generally fails to encourage better adaptation by agricultural producers or to support their greater economic security. Instead, it primarily focuses on meeting food production targets and thus limits the producers' own independent moves towards adaptation. The phenomenon of maladaptation at the policy level is discussed in consideration of the general public's and the authorities' awareness of climate change and climate variability, and the role of science in shaping this awareness.

1. Introduction

Adaptation to climate change in the agricultural sector in the Russian Federation has to date been only poorly addressed, if at all. This can be explained partly by the widespread expectation in this country that global warming will benefit agriculture (Sirotenko et al., 1997; Perelet et al., 2008). Yet several authors predict regional variations in the effects of climate change within the Russian Federation: some regions could expect positive effects on crop productivity and yields while others would be negatively affected (Alcamo et al., 2007; Belyaeva and Bokusheva, 2015).

Tyumen Province, which is located in the Ural Federal District of the Russian Federation, appears to number among the regions experiencing ambiguous effects from global warming. It comprises Tyumen Province which is often (but not here) referred to as Tyumen Province South (marked dark grey in Fig. 1), Khanty-Mansi Autonomous District and Yamal-Nenets Autonomous District (both marked light grey in Fig. 1). The main focus of this paper is Tyumen Province, the only region in which climatic conditions allow for substantial agricultural production.

Agriculture is the main land use category in the southern districts of Tyumen Province, which are located in the forest-steppe zone with climatic conditions well suited to agricultural production. Here, the seasonal temperatures, vegetation period, and prevalence of black earth and podzol soils are favourable for the production of spring grains and vegetables. As a result, agriculture in districts of the forest-steppe zone accounts for over 57% of total land use (Department of State Registration, 2016), as opposed to only 26% respectively 3% in the districts of the sub-Taiga and South-Taiga zones (ibid.). Animal husbandry and crop production have almost equal shares in the total regional output, namely 49.2% respectively 50.8% (Federal State Statistics Service, Tyumen Province, 2015). Pig and poultry farming are the predominant types of animal husbandry, spring wheat, oat and barley the main crops grown in the province (ibid.).

Agricultural production is in the hands of three legally defined producer groups: agricultural enterprises, peasant farms, and households. Peasant farms are officially defined as being those founded by family members for whom commercial agricultural production is the main economic activity (Duma, Russian Federation, 2003). A maximum of five persons unrelated to the head of the farm may be employed there (ibid.). Households likewise carry out family-based agricultural production but they,

E-mail address: nataliya.stupak.1@hu-berlin.de (N. Stupak).

http://dx.doi.org/10.1016/j.envsci.2016.10.003
1462-9011/

Fig. 1. Tyumen Province in the Russian Federation.
Source: https://en.wikipedia.org/wiki/Tyumen_Oblast.

unlike the peasant farms, should pursue this occupation only part-time and produce predominantly for their own consumption. All other types of agricultural producers, regardless of their size and legal form, fall into the category of agricultural enterprise.

Agricultural enterprises and households contribute the largest proportion of the overall agricultural output of Tyumen Province (see Table 1). The former specialize in the production of cereals and poultry (meat and eggs), the latter in the production of ovine and caprine, potatoes and other vegetables.

Since the oil and gas industry is the main economic resource in Tyumen Province, the agricultural sector accounts for only 1.2% of the gross regional product (Federal State Statistics Service, Tyumen Province, 2015). However, the agricultural sector plays a vital role in assuring that the rural population have both employment and food security. Every rural household is engaged in some way in agriculture and also depends overwhelmingly on its own food production.

Table 1
Agricultural Production in the Agricultural Enterprises and Households of Tyumen Province.

Indicator	Agricultural Enterprises	Households
Agricultural land, in thousand ha	79.7	2.9
Share in total agricultural production, %	41.3	50.1
Share in animal production, %	52.2	41.3
Share in crop production, %	33.7	59.1
Production of		
Beef and veal, %	43.2	49.5
Pork, %	46.0	43.9
Ovine and caprine, %	0.1	97.3
Poultry meat, %	94.7	4.7
Milk, %	47.6	46.1
Eggs, %	94.4	4.9
Cereals, %	81.2	0.1
Potato, %	25.9	68.8
Vegetables, %	23.3	72.3

Source: Federal State Statistics Service, Tyumen Province, 2015.

Several studies forecast the expansion of agricultural production in the north of Tyumen Province due to the anticipated increase in the average annual temperature by 0.2–0.5° C per decade (Frey and Smith, 2003; Shulgina et al., 2011) and the subsequent increase in the duration of the vegetation period by four days per decade (Shulgina et al., 2011). Yet the study by Degefie et al. (2014) suggests rather that those areas of Tyumen Province where agriculture is currently the main economic activity will simultaneously suffer negative effects from climate change. Here, the climate is likely to become drier and warmer, thus increasing the risk of drought (ibid.) and posing a threat to agricultural production. Discussion of how best to adapt to these prospects is therefore imperative.

There are two dimensions to climate change adaptation: firstly, adaptation by agricultural producers themselves, which is also known as autonomous adaptation (Fankhauser et al., 1999), and, secondly, adaptation at the policy level (Urwin and Jordan, 2008; Smit and Skinner, 2002). While most studies to date have considered adaptation in terms of the single farm, locality, or community (Reidsma et al., 2010; Olesen et al., 2011; Lee et al., 2014; Jain et al., 2015; Truelove et al., 2015; Warner et al., 2015), others have emphasised the importance of climate change adaptation at the policymaking level (e.g. Fankhauser et al., 1999; Howden et al., 2007; Bisbroeck et al., 2010; Tompkins et al., 2010). Indeed, the specific role of policies in promoting or hindering adaptive behaviour is often, and increasingly, emphasised (Amundsen et al., 2010; Adger et al., 2003, 2005, 2009; Demeritt and Langdon, 2004; Pitt and Randolph, 2009; Smit and Skinner, 2002; Truelove et al., 2015). Yet only a few such studies provide any detailed analysis of concrete policies and their implications for climate change adaptation (e.g. Urwin and Jordan, 2008).

The present paper aims to fill this research gap by exploring the role of policies in promoting or hindering agricultural producers' adaptive behaviour. Its objective is to contribute to a better understanding of maladaptation to climate change at policy level.