SARUD – A PROJECT FOR IMPLEMENTATION OF MASTER STUDIES IN RUSSIA AND KAZAKHSTAN

[1]Martin Dieterich, [2✉]Axel Schwerk, [3]Olga Anciferova, [4]Anargul Belgibayeva, [5]Oleg Blinov, [1]Anna Borsuk, [6]Izabela Dymitryszyn, [7]Taťyana Gorbacheva, [8]Jakub Husák, [9]Erzhena Imeskenova, [10]Aliya Ismailova, [11]Niyazbek Kalimov, [7]Nina Kazydub, [12]Galina Korotkova, [13]Olesya Kovaleva, [8]Michal Lošťák, [14]Nadezhda Meleshenko, [15]Nurgul Nurmukhanbetova, [16]Iraida Sangadieva, [17]Nalima Sartanova, [18]Liubov Schmidt, [18]Andrey Shindelov, [19]Angelika Thomas, [20]Zhenis Zharlygassov

[1]Institute of Landscape and Plant Ecology, Faculty of Agricultural Sciences, University of Hohenheim, Germany

[2]Laboratory of Evaluation and Assessment of Natural Resources, Faculty of Horticulture, Biotechnology and Landscape Architecture, Warsaw University of Life Sciences – SGGW, Nowoursynowska Street 166, Warsaw, 02-787, Poland, 0048 22 59 32224, aschwerk@yahoo.de

[3]Institute of Economics and Management of Federal State Educational Institution of Higher Education, Michurinsk State Agrarian University, Russia

[4]Department of economics and accounting, Agrarian-economic institute, sh.Ualikhanov Kokshetau state university, Kazakhstan

[5]Department of Economics, Accountancy and Financial Control, Omsk State Agrarian University named after P.A. Stolypin, Russia

[6]Laboratory of Evaluation and Assessment of Natural Resources, Faculty of Horticulture, Biotechnology and Landscape Architecture, Warsaw University of Life Sciences – SGGW, Poland

[7]Department of Agronomics, Plant Breeding and Seed Research, Agrotechnological Faculty, Omsk State Agrarian University named after P.A. Stolypin, Russia

[8]Department of Humanities, Faculty of Economics and Management, Czech University of Life Sciences Prague, Czech Republic

[9]Chair of landscape design and ecology, faculty of agronomy, Buryat State Academy of Agriculture named after V. R. Philippov, Russia

[10]Department of Accounting and Audit, Faculty Economic, JSC „S. Seifullin Kazakh Agrotechnical University", Kazakhstan

[11]Agrarian and Biological Faculty, Akhmet Baytursynov Kostanay State University, Kazakhstan

[12]Center of research and development of social and economic sciences and the international scientific projects of Federal State Educational Institution of Higher Education, Michurinsk State Agrarian University, Russia

[13]Faculty of Public Administration, Novosibirsk State Agrarian University, Russia

[14]Department of Economy, Faculty Economic, JSC „S. Seifullin Kazakh Agrotechnical University", Kazakhstan

[15]Department of chemistry and biotechnology, Faculty of natural sciences, sh.Ualikhanov Kokshetau state university, Kazakhstan

[16]Chair of economics and regional management, faculty of economics, Buryat State Academy of Agriculture named after V. R. Philippov, Russia

[17]Department of Finance and Banking, Faculty of Economics, Akhmet Baytursynov Kostanay State University, Kazakhstan

[18]Department of International Affairs, Novosibirsk State Agrarian University, Russia

[19]Institute of Applied Agricultural Research, Nuertingen-Geislingen University, Germany

[20]Akhmet Baytursynov Kostanay State University, Kazakhstan

Abstract

The development and implementation of Masters programs on Sustainable Agriculture and RUural Development (SARUD) in Russia and Kazakhstan is analysed based on the components of the devised programs and the profiles of the enrolled students. The contents of the study programs show differences which are in line with the respective aggregative majors (economics, agronomy, public administration) under which they are implemented. With respect to age and gender ratio of the students, regional aspects seem to be more important than the aggregative majors. Generally, the study programs match to a high degree the situation analyses carried out prior to program development. In order to assess the quality of the study programs student surveys will be a useful tool. The results of our study underline the importance of inter- and transdisciplinary approaches in education.

Introduction

Most rural areas in the Russian Federation and Kazakhstan are characterized by dramatic changes in the agriculture and food sector, due to privatization, modernization and increasing differences between large-scale agro-holdings and small-holder farms. The effects of the current changes on labour market, quality of life and depopulation in rural areas, exploitation of natural resources, soil degradation, biodiversity and landscape differ from region to region. The central black soil regions close to the Moscow markets have more opportunities for economic diversification and subsequently invest in the development of various economic sectors including tourism and recreation, while the potential for diversification in Western Siberia is more limited. The common denominator for rural development is the great importance of agriculture and natural resources providing for ecosystem services and opportunities towards diversification (Lindner and Vorbrugg, 2012).

State regulations, research and education are already responding to the challenges imposed by the changes outlined, e.g. in Russia through the Policy Concept of Sustainable Rural Development and the RUDECO Vocational Training project (Dieterich and Merzlov, 2013; Russian Government, 2015). In Kazakhstan, issues of sustainable agriculture and rural development are regulated by a Law "On State Regulation of the Development of the Agro-Industrial Complex and Rural Territories" adopted in 2005. According to this regulation, when defining conceptual approaches directed towards drafting of projects, scientific research work and priority directions with respect to development of agricultural science for the period 2018-2020, the priority is attributed to "Sustainable development of agro-industrial complex and safety of agriculture products". However, in Russia and Kazakhstan there is a considerable lack of sustainable rural development strategies and integrated approaches for the regional or local levels. This includes knowledge about up-to-date methods and approaches (e.g. stakeholder involvement) and skilled people to assess and further develop agro-ecosystems services. Beyond agricultural products, such services include environmental and social output. To fill this gap, higher education institutions together with public and private services need to re-define job qualifications and education for (future) decision makers and professionals in agriculture and related areas incorporating principles of sustainable rural development.

The idea of sustainable development evolved from the Conference on the Human Environment in Stockholm in 1972 and was further developed during the following decades (Adams, 2006: 1). It became popularized in the broader political arena through the 1987 report of the World Commission on Environment and Development (WCED, 1987) and subsequently by the United

Nations Conference on Environment and Development (UNCED) held 1992 in Rio de Janeiro, where the Agenda 21 document was produced. Whereas, the traditional concept of sustainability originally coined in forestry has a strong supply-ecological connotation, the mainstream 1987 WCED definition focuses on the demand side and therefore the socio-economic system. Accordingly, over the last decades most research on sustainable development had a strong and often only focus on the economic dimension (Wichaisri and Sopadang, 2018). This has caused the sustainability concept to become rather arbitrary.

In order to tackle the above mentioned tasks, the international project "Sustainable Agriculture and Rural Development (SARUD)" was initiated in 2016 (Sangadieva et al., 2016). The project consortium consists of 28 partners and is coordinated by the University of Hohenheim (Stuttgart, Germany). The major aim of this project is to implement professional Masters programs on sustainable agriculture and rural development in Russia and Kazakhstan tailored to the demand of regions for professionals of public services, local and regional governments and private service providers, so that (future) professionals are educated and trained to adopt theoretical development concepts for specific local conditions, access (international) experiences and apply up-to date methods for the assessment of agro-ecosystems and for natural resource and agriculture land use planning and management. The Masters programs devised in the SARUD context have been implemented at the following universities under the respective aggregative majors: Omsk State Agrarian University named after P.A. Stolypin (OSAU: agronomy major, economics major), Michurinsk State Agrarian University (MSAU: economics major), Buryat State Academy of Agriculture (BSAA: economics major), Novosibirsk State Agrarian University (NSAU: administration major), S. Seifullin Kazakh Agro Technical University (KASU: economics major), A. Baitursynov Kostanay State University (KSU: economics major), and Sh. Ualikhanov Kokshetau State University (KokSU: economics major). Masters programs were launched in the academic year 2017/2018 at all universities.

The first phase of the SARUD project consisted of a situation analysis to identify and describe the needs for the knowledge, skills and competencies of the graduates with a master degree in sustainable rural development in Russia and Kazakhstan and specifically in the geographical regions and territories where universities involved in the project operate. Based on the data from this situation analysis the most needed issues for rural areas of Russia and Kazakhstan related to education were determined (Table 1).

The aim of this paper is to analyse and evaluate the process of the implementation of the master degree programs on sustainable agriculture and rural development in Russia and Kazakhstan. We assess how these programs have been developed in the two countries, what characterizes students enrolled in the Masters programs, and what differences and similarities exist between the two countries and the different programs implemented at the different HEIs with respect to content and student profiles.

The Masters programs were designed to properly integrate agronomy, ecology, economics and socio-cultural issues reflecting the basic pillars of sustainable rural development (interdisciplinarity component). In addition, the programs target the integration of theory and practice (transdisciplinarity). In order to assess the integration of the basic components into the different Masters programs and to classify and compare the backgrounds of students registering for the according programs we reviewed (1) the focus on theoretical and practical aspects, (2) the possibilities for students to take part in shaping the program and (3) the allocation of learning contents to key topics. Concerning student backgrounds the focus was on (1) demographic aspects and (2) the initial qualification when entering the Masters program.

Based on the results we discuss, to what degree the implementation of the Masters programs fits to the situation analysis performed.

Relevant education issues in Russian rural areas
• the graduates should be able to identify the main trajectories of sustainable socio-economic development of rural territories in the context of a transition to market based approaches;
• the graduates should determine main pathways towards sustainable rural territories resulting in socio-economic development in agriculture without harming nature and protecting continued function of ecosystem services;
• the graduates should know how to develop the non-agrarian sector in rural settlements.
Relevant education issues in Kazakh rural areas
• the graduates should know how to prepare and implement development projects in order to achieve sustainable development of rural areas;
• the graduates must be skilled in economic issues (e.g. financial management) when dealing with processing of agricultural production and agricultural commodity sale;
• the graduates should also be able to work in livestock or crop production (the need to have knowledge about the agricultural production sector).

Table 1: Education issues relevant for rural areas of Russia and Kazakhstan identified in the situation analysis.

Materials and Methods

Data regarding the Masters programs were provided by the Russian and Kazakh universities in the form of in-depth study guided by aide memoire (Swain, 2013) forming the questions resulting in the situation analysis. Other needed data were collected by analysing the respective Masters programs and module syllabi. With respect to students enrolled in the study programs, data on age and sex as well as the background qualification were collected from descriptive statistics provided by the participating HEIs.

In order to assess the focus of the study programs on theoretical and practical aspects we compared the total number of ECTS credits and their distribution to the theoretical part (lectures), the practical exercises and the exam related workload. The theoretical segment of the Masters programs was analysed in more detail by comparing the total number of modules (as module is to be understood a single course of the respective program) necessary to be accomplished by the students. In order to assess possibilities for the students to take part in shaping the learning contents, we also compared the share of compulsory and elective modules.

The learning contents of each module were allocated to the four basic topics "economy", "ecology", "society" and "agronomy". We calculated the percentage share of the total learning contents of the study programs dealing with these basic topics to assess the balance and completeness of the study programs. This was done by multiplying percentage shares for the topics in the different modules with the didactic hours of the respective module. The module values were summed up for each basic category by adding the values for the compulsory modules, and values for the required number of elective modules. The total was then divided by the respective number of modules for each study program. Since the percentage shares of the basic topics to be covered in lectures often differed between elective modules, students might reach higher or lower values for each basic topic depending on their choice of electives. Therefore, for each of the key topics the minimum and maximum possible values were calculated.

We compared the total number of students and the share of male and female students between the Masters programs (major agronomy, major economics, major administration). We also compared the age distribution of the students entering the different Masters programs. Due to the low numbers of students enrolled in the Masters programs in Kazakhstan, the data on students from the three Kazakh Universities were pooled. Differences in proportions of male and female students were tested using the Chi-square test. Because of the low number of samples statistical significance was estimated using a Monte-Carlo-estimation (Mehta and Patel, n.d.) (10000 samples, confidence

limit 99 %). Differences in the age of the students between the Masters programs at the different universities were tested using the Median test. The statistical analyses were carried out using IBM SPSS Statistics, version 23.

The initial background qualification was determined for each student based on their bachelor degree and/or current employment. We calculated the share of students with a background according to the chosen master program as well as the share of other backgrounds for each study program in Russia (economics, agronomy, administration) and the study program under the economics major at the Kazakh universities.

Results

The total number of ECTS credits is 120 for the Russian Masters programs and 122 for the according program in Kazakhstan. However the allocation of the ECTS credits to the theoretical study program, the practical part of the study and the exam part differs (Table 2). While in Russia the study programs under the agronomy and economics majors have a very similar distribution of the ECTS credits, a far higher number of credits is assigned to the theoretical part for the Masters program under the major administration. The Masters program under the major economics in Kazakhstan has a higher amount of credits for the exam part. The amount of credits for this part is also elevated for the master under the administration major in Russia. Consequentially, this program has by far the lowest number of credits associated with the practical part.

The total number of modules to be completed by students differs between the Masters programs. The range is between 25 modules for the Russian master under the agronomy major and 16 modules for the Kazakh master under the economics major. In Kazakhstan only 7 modules are compulsory, 9 modules are elective. In Russia, the number of compulsory modules ranges from 14 to 17 and the number of elective modules ranges from 5 to 8 (Table 2).

Characteristic		Russia – Admin.	Russia – Agronom.	Russia – Econom.	Kazakhstan – Econom.
ECTS	theoretical part	84	66	63	63
	practical part	27	48	51	43
	exam	9	6	6	16
Modules	compulsory	17	16	14	7
	elective	8 (16)	5 (10)	5 (10)*	9 (17)
% Economy	min.	29.28	24.02	30.79	19.76
	max.	29.28	30.38	36.27	35.24
% Ecology	min.	24.25	20.38	18.65	16.90
	max.	24.25	25.38	19.84	31.67
% Society	min.	22.56	20.83	26.59	14.52
	max.	22.56	24.92	33.02	28.81
% Agronomy	min.	23.10	22.95	15.87	23.10
	max.	23.10	31.14	18.97	30.00

*Study program „Russia – Economy" offers one optional module. This module was not taken into account when calculating the minimum and maximum values for the learning contents.

Table 2: Characterization of the Masters programs with respect to numbers and distribution of ECTS credits, number and distribution of modules (total number of elective modules offered in brackets), and minimum and maximum share of contents relating to the basic topics economy, ecology, society and agronomy within the lecture part.

With respect to the percentage share of the learning contents of the study programs on the different key topics the study program in Kazakhstan showed the biggest differences between the topics.

Generally, highest maximum values were in good agreement with the respective aggregative majors (Table 2).

The total number of students and the proportions between male and female students differed between the programs (Figure 1). The highest number of students was recorded in Omsk with 18 students in the program under the agronomy major, and 15 students in the program under the economics major. The study programs in Kazakhstan were chosen by 8 students at all three universities combined. The proportions between male and female students were significantly different between the study programs (Chi-square test, Monte-Carlo-estimated statistical significance $p < 0.01$). The proportion of males was particularly high in the study programs at Omsk, whereas at BSAA (economics) only female students inscribed for the study program.
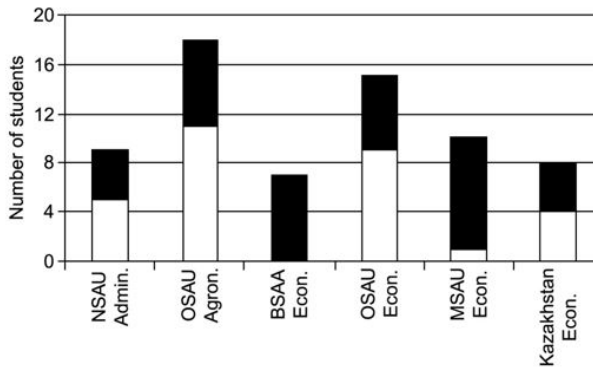

Figure 1: Number and sex of students of the respective study programs. White part of the bars – males, black part of the bars – females (Chi-square test, statistical significance based on Monte-Carlo-estimation, $p < 0.01$).

Significant differences were also revealed with respect to the age of the students (Median test, $p < 0.05$) (Figure 2). On average the oldest students were recorded in Omsk with median values above 25 years, whereas in all other programs the median value were 22 years. Compared to the age ranges recorded for the Masters programs at other participating universities, narrow ranges in student age were observed for Kazakh universities and those of the economics major at MSAU.

The allocation of the initial background qualifications of the students to the different Masters programs (Table 3) indicates that quite often students had a background that differed from the aggregative major. A fit >50% was reached for three study programs only: Economics in Kazakhstan (75.0 %), agronomy at OSAU (72.2 %) and administration at NSAU (55.6 %). Low or very low values of fit were recorded for economics at BSAU (14.3 %) and OSAU (26.7 %).

DISCUSSION

Awareness of the need for targeted education towards sustainable development is not limited to Russia and Kazakhstan. As early as in 1991, Cornell University (Ithaca, NY) had established a graduate minor in conservation and sustainable development (Shelhas and Lassoie, 2001). Wang (2010) emphasizes the need for advanced ecotourism education in China in order to improve sustainable development. Mulá et al. (2017) mention increasing activities regarding education for sustainable development in higher education worldwide. Education is of high priority among the sustainable development goals adopted by UN member states (Vlidimirova and Le Blanc, 2017). Our study not only stresses the need for developing study programs with a focus on sustainable

rural development, but also revealed differences with respect to both the implemented study programs and the enrolled master students.

The studied parameters of the Masters programs exhibit differences between the respective aggregative majors as well as the countries. The allocation of ECTS and the relationship between compulsory and elective modules is mainly predetermined by the rules of the respective country or university. This highlights the importance of institutions in shaping the educational process. Similarly, the degree of practical content is determined by the major under which a Masters program is launched. Administration requires considerable knowledge in procedures and the legal framework governing activities. Therefore and not surprisingly the practical part of the Masters program under the major administration is comparatively low. Especially interesting is the allocation of the learning contents to the key topics in the Masters programs. The fact that learning contents independent of the selected majors cover basic topics rather well can be considered as a strong indication for appropriately balanced and well-developed study programs.
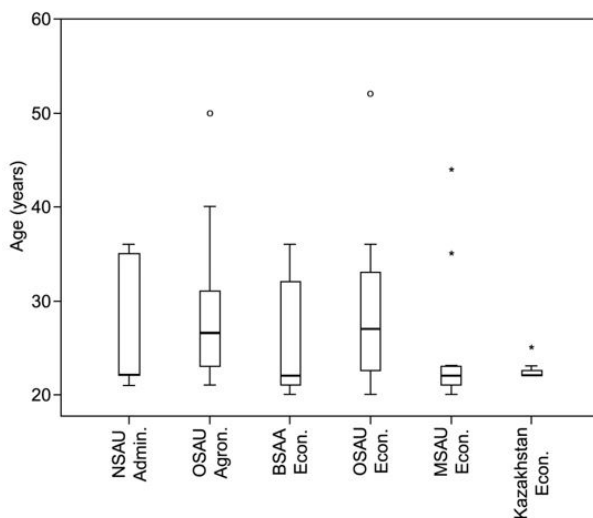

Figure 2: Age distribution of students in the respective Masters programs shown as box-whisker plots. Median values indicated by a bar, the boxes show inter-quartile distances. Whiskers indicate range of data without outliers (distance from the edge of the box between 1.5 and 3 times of box length, shown as circles), and extreme values (distance from the edge of the box more than 3 times of the box length, shown as asterisks).

Background	NSAU – Admin.	OSAU – Agronom.	BSAA – Econom.	OSAU – Econom.	MSAU – Econom.	Kazakhstan – Econom.
Administration	**5** **(55.6 %)**	-	1 (14.3 %)	2 (13.3 %)	1 (10.0 %)	-
Agronomy	1 (11.1 %)	**13** **(72.2 %)**	4 (57.1 %)	3 (20.0 %)	1 (10.0%)	1 (12.5 %)
Economics	2 (22.2 %)	-	**1** **(14.3 %)**	**4** **(26.7 %)**	**4** **(40.0 %)**	**6** **(75.0 %)**
Other	1 (11.1 %)	5 (31.8 %)	1 (14.3 %)	6 (40.0 %)	4 (40.0 %)	1 (12.5 %)

Table 3: Allocation of students with the respective initial background qualification within the Masters programs (Accordance in initial background qualification of students with study program's major printed bold).

With respect to the students age, sex and professional/educational background the results express only limited dependences on the aggregative majors and countries of implementation. We highlight the fact that to some degree regional aspects seem to override the aggregative majors, to which the study programs have been assigned. Students at Omsk differentiated from study programs in other regions of Russia or in Kazakhstan in terms of percentage of male and female students as well as the age of students. However, this situation might be a valid only in the current year and may not describe a regular pattern.

It is difficult to discuss the results with respect to the background of the students, because – on one side – a high number of students with the background of the respective aggregative major may express a good match between profile and topics addressed. On the other hand, students switching fields might express that the respective study program provides them with well elaborated topics in order to enlarge their knowledge base towards additional expertise on sustainable development. In order to gain more detailed information about such aspects and to assess the quality of the study programs future student surveys to accompany program implementation will be useful. For example, Savelyeva and Douglas (2017: 218) conducting questionnaires and collecting reflective narratives discovered an 'increase in the self-perceived knowledge and behavioral aspects of sustainability consciousness of Hong Kong students, who were enrolled in the General Education course'.

For both Russia and Kazakhstan the situation analysis revealed a need for education towards sustainable development with a special focus on economic issues. These aspects are fulfilled by all the Masters programs in both countries. In Russia, a special need was expressed for training the students with respect to development of the non-agrarian sector in rural settlements. Apart from the study program under the major agronomy, which has to have a strong focus on this key topic, the Masters programs in Russia had a comparatively low focus on agronomy. This might be treated as an indicator that non-agrarian aspects indeed play a more dominant role in these programs. In Kazakhstan, however, a special need was identified for training in livestock or crop production, an aspect which is indeed well addressed by the Kazakh study program.

Conclusions

Masters programs dealing with sustainable agriculture and rural development were successfully implemented at Russian and Kazakh universities. Study programmes match well the situation analysis carried out prior to the implementation. With respect to student age and gender, regional aspects seem to override the aggregative majors. In order to assess the quality of the study programs future student surveys will be a useful tool. The programmes developed under an international cooperation, demonstrate the importance of transboundary exchange of knowledge in education, because the experience of EU universities was transposed into Russian and Kazakh universities in such a way they are able to match the needs of their rural areas.

Acknowledgement

References

Adams, W.M. (2006) *The future of sustainability. Re-thinking environment and development in the twenty-first century*, IUCN: Report of the IUCN Renowned Thinkers Meeting [Online]. Available: https://cmsdata.iucn.org/downloads/iucn_future_of_sustanability.pdf, [25 Jan 2018].

Dieterich, M. and Merzlov, A. (eds.) (2013) *Sustainable rural development*. Moscow: Ellis Lak Press.

Lindner, P. and Vorbrugg, A. (2012) 'Die Wiederkehr der Landfrage. Großinvestitionen und die Neuordnung der Landwirtschaft in Russland', *Osteuropa*, vol. 62, no. 6/8, pp. 325-342.

Mulà, I., Tilbury, D., Ryan, A., Mader, M., Dlouhá, J., Mader, C., Benayas, J., Dlouhý, J. and Alba, D. (2017) 'Catalysing change in higher education for sustainable development: A review of professional development initiatives for university educators', *International Journal of Sustainability in Higher Education*, vol. 18, no. 5, pp. 798-820. http://dx.doi.org/10.1108/IJSHE-03-2017-0043

Russian Government (2015) 'Decree on the approval of the Strategy for Sustainable Development of Rural Territories of the Russian Federation for the period up to 2030', Moscow: Russian Government.

Sangadieva, I., Imeskenova, E., Ishigenov, I., Shadonova, T., Ochirova, E. and Tsybikov, B. (2016) 'Human resources as a factor for sustainable rural development', *Proceedings of the Scientific and practical conference dedicated to the Day of Russian Science and the 85th anniversary of "The Buryat State Agricultural Academy named after V.R. Philippov"*, Ulan Ude, pp. 263-265.

Savelyeva, T. and Douglas, W. (2017) 'Global consciousness and pillars of sustainable development. A study on self-perceptions of the first-year university students', *International Journal of Sustainability in Higher Education*, vol. 18, no. 2, pp. 218-241. http://dx.doi.org/10.1108/IJSHE-04-2016-0063

Mehta, C.R. and Patel, N.R. (2018) Exact tests [Online]. Available: http://www.sussex.ac.uk/its/pdfs/PASW_Exact_Tests.pdf, [25 Apr 2018].

Shelhas, J. and Lassoie, J.P. (2001) 'Learning conservation and sustainable development: an interdisciplinary approach', *Journal of Natural Resources and Life Sciences Education*, vol. 30, pp. 111-119.

Swain, N. (2013) *Green Barons, Force-of-Circumstance Entrepreneurs, Impotent Mayors (Rural Change in the Early Years of Post-Socialist Capitalist Democracy)*, Budapest: Central European University Press.

Vladimirova, K. and Le Blanc, D. (2016) 'Exploring links between education and sustainable development goals through the lens of UN flagship reports', *Sustainable Development*, vol. 24, no. 4, pp. 254-271. http://dx.doi.org/10.1002/sd.1626

Wang, X. (2010) 'Critical aspects of sustainable development in tourism: advanced ecotourism education', *Journal of Sustainable Development*, vol. 3, no. 2, pp. 261-263. http://dx.doi.org/10.5539/jsd.v3n2p261

Wichaisri, S. and Sopadang, A. (2018) 'Trends and future directions in sustainable development', *Sustainable Development*, vol. 26, no. 1, pp. 1-17. https://doi.org/10.1002/sd.1687

World Commission on Environment and Development (WCED) (1987) *Our Common Future*, New York: Oxford University Press.