PROMOTING SECTORAL ADJUSTMENTS AND DEVELOPMENT BY BOOSTING THE AGRI-FOOD EDUCATION AND RESEARCH IN MONGOLIA

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Abstract: *The effort of supporting the consolidation and the increase of competitiveness of the agri-food sector can and should benefit of the entire apport of the education, science and research in all economies. To ensure the coordination of the actions and measures a partnership needs to be established between the policymakers, the education and research institutions and agencies and the business sector. Operating at the level of young and motivated future specialists requires not only dedication yet a clear view of the medium and long-term projections for the sectors they are providing with experts and expertise. The analysed case relates the specific implementation actions, results and their expected future impacts in relation to the capacity to answer the current and future demand of the agri-food sector. Agriculture as the second employer continues to play a central role in providing for the specific consumption needs and represents a strong cultural element to preserve for the upcoming generations. Therefore, the analysis concentrates on the evolution of the agriculture and the projected impact of structured capacity building actions as part of a project-based set of activities.*

Key words*: Capacity Building, Agri-food Education and Research, Mongolia*

INTRODUCTION

The Mongolian economy and agriculture undergoes the same specific stages post-transition from a centralised economy to a market economy. These developments are closer to the realities and stages that Central, Eastern and South-eastern Europe countries and regions were undergoing over the similar timeframe enabling a wider understanding in mixt EU consortiums combining the objective view of the West with the experience from the East. Under these circumstances the support to upgrade the education and research with the aim of further developing the agri-food sector fits the efforts of the universities to consolidate the economy on the long run. Analysing the evolution of the previous stages along the past twenty years in Mongolia brings the complement of understanding that explain the current actions, including the project-based activities.

MATERIALS AND METHODS

The approach consists of a wide analysis of the general economic evolution and more particularly of the agri-food sector developments based on secondary data collected from the official statistical office and services in Mongolia. The analysis aims at placing the capacity building sectoral intervention within the context and the economic realities. A concise case study based on a specific project implementation targets the relevant answers as potential contribution to support the sectors' needs and feed the expected transformations in terms of future adjustments.

RESEARCH RESULTS

For the purpose of placing within the context the later analysed and described intervention as project-based effort to support the agri-food sector by investing and developing the education and research, the initial part attempts to introduce a concise set of observations for the past two decades of evolution of the economy and particularly the agricultural sector in Mongolia.

The evolution of the total population is positive recording a growth of 27% in 2019 as compared to the level from the year 2000 as a positive development since the distribution between urban and rural indicates a stable level for the rural areas and an almost linear increase for the urban areas [8,13].

The labour force in Mongolia reached 1.273.896 persons in 2019 while the number of employed people accounted 1.146.160 persons, the same year, both values very near to the 2016 level after a peak of 7% higher figures in 2017 and 2018. Over the past two decades (2000-2019) the volume of total labour force has increased by 50% while the employed population followed a growth of 41%. In decadal averages, the difference between the labour force and the employed people has practically doubled during the last decade while the employment-to-population ratio has decreased from 60,16% for the first decade to 56,46% for the second decade. The difference is also contained in the decadal average of unemployment rates moving from 5,08% for 2000-2010 period to 8,42% for 2011-2019 period [8,13].

Worth adding that the lowest rates (2,8%) were recorded for 2007 and 2008 and the highest rates (10-11,6%) were seen in 2009, 2016 and 2019. In absolute values the number of unemployed persons in the year 2019 is over three times higher than in the year 2000 affecting 127.736 people [8,13]. The employment improved in 2020 despite the severe lockdown and the distribution by economic sectors indicate the agriculture as the second employer in the country (22%, with 257.584 persons) overpassing the industry by a 10% difference (235.719 persons) or two percentual points [15,16].

The main agricultural production is represented, in order of importance and volumes by milk, cereals, meat, potatoes, vegetables and eggs. The evolution over the past twenty years, introduced in the Table 1, indicate a sustained growth for the milk production with the exception of 2002 and 2010-2011 periods. The cereals production does not present a pattern and the frequent oscillations could be attributed to the weather dependence while the meat production regains and overpasses the level of the year 2000 only after 2015 [8,13].

Table 1.

Main agricultural production per capita, by year (units)

Product / year	Meat, slaughter weight	Milk	Eggs	Cereals	Potatoes	Vegetables
2000	129,90	157,10	2,80	59,40	24,60	18,40
2001	93,40	119,70	3,20	58,60	23,90	18,40
2002	83,10	12,50	1,70	51,20	21,10	16,20
2003	61,60	117,40	2,80	59,40	24,60	18,40
2004	77,50	161,30	6,40	58,60	23,90	18,40
2005	72,20	167,20	8,40	51,20	21,10	16,20
2006	66,20	174,60	7,40	50,60	31,60	23,90
2007	73,10	178,10	17,70	55,00	31,80	19,50
2008	83,90	172,00	18,00	80,10	50,70	29,70
2009	100,00	183,50	11,40	145,60	56,20	29,00
2010	73,50	123,60	19,60	129,60	61,30	30,00
2011	75,40	164,60	24,90	160,10	72,40	35,50
2012	96,70	215,90	20,80	158,90	90,30	36,40
2013	105,40	234,80	22,30	123,30	67,50	35,90
2014	100,40	263,50	24,80	161,80	55,60	36,10
2015	151,10	295,00	33,90	66,10	55,30	24,40
2016	132,10	294,50	39,30	157,10	54,20	31,00
2017	149,50	296,80	32,20	76,90	39,00	26,00
2018	163,10	285,70	48,10	141,30	53,30	31,60
2019	169,60	328,70	54,70	129,80	58,80	30,30

Source: Mongolian Statistical Information Service, 2020

The largest increase in livestock over the past two decades is observed for goats and sheep reaching 285%, respectively 233% from the levels back in the year 2000. Important increases of over 150% are noted for horse and cattle, where the number of cattle heads overpasses 4,5 million and the horses go above 4 million heads in 2019 [8,13].

The gross livestock output evolution for the first observed decade presents a moderate growth reaching five times the start level at the end of the decade in 2010 while the growth during the second decade (2011-2019) representing 3,2x the start level from 2011 elevates the total output from 1.585.329,6 thou. MNT to 5.182.602,6 MNT in 2019 [8,13].

The agricultural output evolution during the last decade as crop production and fodder is introduced in the Table 2 and highlights the high variability in the cereals production as the most significant crop group in terms of volume. The potatoes and vegetables recover at a relatively steady level after encountering slight declines during the middle tier of the analysed period. The gross agricultural output evolution since the year 2000 records a non-linear yet sustained growth in absolute values increasing by eight times along the observed timeline levels tempered to half the amplitude when expressed in constant prices base 2010 [8,13].

Table 2.

Total harvest, by type for selected productions (t)

	Cereals	Potatoes	Total Vegetables	Fodder crops	Technical crops	Rapes	Hay harvest	Handmade fodder
2010	355.060,90	167.955,81	82.266,48	34.792,31	11.078,00	11.070,00	1.137.281,80	32.745,20
2011	446.050,49	201.638,90	98.973,94	40.444,10	6.132,70	2,30	1.195.238,45	46.743,85
2012	479.348,77	245.934,97	98.917,56	46.219,24	20.983,70	20.983,60	1.175.258,60	39.044,01
2013	387.043,27	191.619,22	101.761,58	42.637,81	41.735,10	41.730,10	1.169.319,40	36.602,33
2014	518.793,00	161.488,51	104.791,93	44.277,79	52.099,03	51.912,48	1.178.673,76	40.260,36
2015	216.267,84	163.766,86	72.347,62	49.163,70	23.145,26	23.145,25	1.028.671,40	39.882,27
2016	483.453,40	165.329,50	94.447,20	53.423,94	21.460,24	21.440,20	1.275.399,41	45.789,92
2017	238.101,90	121.808,42	82.102,03	47.894,89	13.862,86	13.504,80	1.008.145,64	52.288,15
2018	453.849,20	168.882,60	100.731,70	123.839,90	23.921,30	23.049,60	1.229.428,80	51.690,70
2019	433.305,40	192.239,90	99.546,60	121.117,20	34.027,10	33.812,90	1.369.212,50	58.440,20

Source: Mongolian Statistical Information Service, 2020

The above-mentioned progress is paralleled by a systematic reduction in farm households' number, the decline accounting for more than 25% of total only during the 2014-2019 period. Complementary, the number of farmer enterprises increased during the same time period (by 3%) and the agricultural area reduced only slightly since the most dramatic decline was recorded in 2002-2003 years. The number of households with livestock records a divergent evolution during the last eight years where the largest groups are represented by households with herds between 101-500 heads (Table 3). While the households with 101-200 heads as the second largest category and represent almost 25% of total are declining over the observed period the first largest category, the households with 201-500, also representing a quarter of total are consistently increasing by a solid 33% in less than ten years. All households' categories above 201 heads are growing, certain even multiplying five times, still the balance point in terms of number of households appears to centre around the 101-500 heads as almost 50% of total. The number of herder households is recovering after an initial decline during the first quarter of the two decades, a relative plateau along the second quarter, a further decline during the third quarter and a good recovery during the fourth quarter bringing back the figures to the level of the 2003-2004 years [8,13]. The analysis focuses on the households' number and not on the size of the

livestock attached given priority to the families and the social component before the economic output and competitiveness.

Table 3.

Grouping of households with livestock, by group for number of livestock

Statistical indicator	2012	2013	2014	2015	2016	2017	2018	2019
Total	207.818	209.933	213.363	216.734	223.761	228.950	228.657	233.317
up to 11	16.827	16.712	14.980	14.226	14.176	13.731	13.616	12.761
11-30	23.449	22.528	20.343	19.933	19.611	19.474	19.475	18.888
31-50	17.792	17.088	15.770	15.478	15.323	15.165	15.473	14.868
51-100	32.902	31.432	29.392	29.266	29.075	28.482	28.529	27.895
101-200	**48.474**	**47.005**	**46.847**	**46.250**	**45.870**	**45.936**	**46.291**	**45.975**
201-500	**50.468**	**53.143**	**58.131**	**60.075**	**63.120**	**65.336**	**64.239**	**67.545**
501-999	**14.276**	**17.123**	**21.092**	**23.070**	**26.632**	**29.499**	**30.230**	**33.043**
1000-1499	**3.046**	**4.076**	**5.620**	**6.950**	**8.144**	**9.182**	**8.777**	**10.004**
1500-2000	**385**	**566**	**816**	**993**	**1.203**	**1.454**	**1.364**	**1.602**
more than 2000	**199**	**260**	**372**	**493**	**607**	**691**	**663**	**736**

Source: Mongolian Statistical Information Service, 2020

Labour productivity evolution at the scale of the entire economy over the past decade has almost doubled, with a consistent increase over the past three years, yet agriculture has increased its labour productivity by 2,64 times clearly influencing the national economy [8,13].The national average income as wages or salaries at monthly level has increased almost linearly along the past twenty years while in agriculture the period 2012-2014 recorded an exponential growth almost equalling the national average (2014) to drop the years after to a relative parallel difference of approx. 200.000 MNT less for the agricultural average, while the real wage index (2010 base) reaches 232,9% in 2018 while the national average attained 160,2% [8,13].

In terms of consumption evolution, the last thirteen years reveal a healthy progression with the vegetables and fruits consumption as growing categories, relative steady meat and meat products and slightly declined consumption of milk. Parallelly, as level of food supply, the dairy products have increased almost three times (2,90) during the last four years, the meat and meat products increased by 30% and the vegetables by 12% during the same period.

Within the presented context one qualified form of response for the specific needs of structural adjustments and development is represented by the capacity building initiatives and actions. The brief case study presentation introduces the punctual implementation of a capacity building project financed by the European Union under the frame of the Erasmus+ Programme [3, 11, 12].

The project under the title "Educational support to agrarian and agri-food university programmes in Mongolia" - APFAA, identified as Erasmus+ programme no. 585593-EPP-1-2017-1-FR-EPPKA2-CBHE-JP is a Key Action 2 project, developing and implementing activities of capacity building in the field of higher education supporting cooperation with partner countries. APFAA was a structural project, aiming at promoting reforms in higher education systems, modernising policies, governance and strengthening relations between higher education systems and the wider economic and social environment. The partnership implementing the project layered three categories of institutions: the funder or the buyer as the Erasmus+ [1]; the beneficiary ministries: The Ministry of Education, Culture and Science of Mongolia [6] and The Ministry of Food, Agriculture and Light Industry of

Mongolia [7]; the implementing partnership composed of the European Universities: AGROCAPUS OUEST RENNES, France [1], Banat's University of Agricultural Sciences and Veterinary Medicine "King Michael Ist of Romania" from Timisoara, Romania [2], Universidade de Santiago de Compostela (USC), Spain [17], the Mongolian Universities: Mongolian University of Life Sciences [5,9], Mongolian University of Science and Technology [10] and National University of Mongolia [14] with the addition of an international NGO, Geres [4].

The implementation targeted three objectives, namely: a. the implementation of an e-learning technology and its use in the involved departments of the partner' universities to improve the availability of the courses content for students and their exchanges with teachers; b. the development of the practical and technological knowledge of Mongolian lecturers to enable the transfer towards the students, completing the theoretical aspect of dispensed courses; c. the approach of the realities of the professional world by the implementation of joint activities such as: job fair, internships and alumni networks.

The project outputs an upgrading of the pedagogical methods by implementation of e-learning while the lecturers take advantage from the direct project activities by acquiring new competences that improve the courses. Approaching the businesses and companies by specific supported activities improve their future integration into the professional world. The project results are diffused to partner universities governance boards, to other universities in the country and ministries. These stakeholders can then decide if the innovations and methodology implemented should be transferred to other departments or universities. They also analyse the sustainability of the implemented activities and their results beyond the project's implementation. The development of relations with companies and businesses provide, on short term, the information complements to the universities for the adaptation of their curricula and courses. On the long run, the central goal is to form skilled Mongolian executives able to answer the specific needs of food production in their country. The project achievements and diffusion are for the benefit of the largest part possible of the Mongolian society aiming at the expected answers at the scale of the society at large.

The specific activities of a capacity building project such as the purchase of equipment, the preparation and the development of demonstrations, trainings, coaching and internship activities supported by the project's mobilities inland or abroad in the partner countries, content development, installation and operationalisation of equipment, development, testing and validating of new educational support products were timely implemented to their large majority. The general lockdown worldwide including Europe and Mongolia prevented a certain number of activities from their implementation that is to say that the complete schedule for the last year of the project was transferred online where that was possible or adequate. Internship, training and exploratory missions were redesigned, moved to the online environment or cancelled where impossible otherwise. Despite the suspended activities during the pandemic lockdown and all along the 2020 year, the staff proved able to transfer most activities online and have an immediate benefit of the e-learning platform and contents as well as of the planning and decision-making support tool developed, tested and implemented during the project's lifetime. Moreover, the above-mentioned tool was designed to support easy adjustments and additions to support more production types in the future according to the business sector or the production needs.

CONCLUSIONS

The specific impact of the project's achievements is expected to generate a greater impact on medium and long term than the level of the results. The transferred and accumulated knowledge, the new services for students, the bridges with the business sector and the hardware and knowledge to support the further development are in place and operated by well trained and motivated staff. The links established during the project's implementation period allow already the planning and the implementation of other collaborative activities on broader and richer range of interests in partnership between the involved Mongolian universities, schools and departments and their European partners.

The open manner of designing and implementing most educational tools and contents allow further development and answer most of the current and potentially future demand from the business sector. The captured and structured case studies represent more than good practices in Mongolian agriculture; they are business models to inspire the students at all levels and practitioners in business towards unexplored possibilities fit to their production reality. The specific and overall immediate impact over the agri-food sector is difficult to capture and analyse due to the effects of the results on medium and long terms and also due to the fact that the 2020 year is totally atypical under the influence of the health-related restrictions. The analysis identifies a great potential impact that can be further boosted in the years to come by the complementary and concerted actions of the partners ignited before the project's end.

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