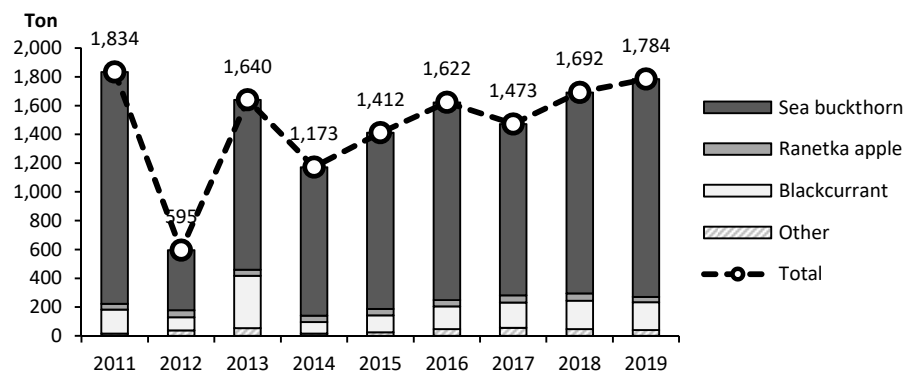# Competitiveness of sea buckthorn farming in Mongolia:
A policy analysis matrix

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Appendix A. Fruit production in Mongolia

Fig. A.1: Fruit production in Mongolia, by types (metric tons).

Source: NSOM(2020a).

Table A.1: Total production of sea buckthorn berry in Mongolia, by region (Thousand US$).

Regions	Provinces	2011	2012	2013	2014	2015	2016	2017	2018	2019
Western	Bayan-Ulgii	15.95	8.78	12.21	34.77	79.71	104.44	69.56	105.53	386.89
	Gobi-Altai	67.31	184.28	146.89	34.77	93.40	91.38	84.59	283.29	108.27
	Zavkhan	-	-	-	23.02	109.83	173.34	156.14	235.43	140.03
	Uvs	3,826.14	347.53	1,941.83	1,651.40	2,876.69	2,785.42	2,904.65	3,393.18	3,872.90
	Khovd	180.24	208.89	238.28	168.94	96.04	114.21	187.93	104.40	113.46
TOTAL OF WESTERN		**4,089.63**	**749.47**	**2,339.21**	**1,912.89**	**3,255.66**	**3,268.79**	**3,402.88**	**4,121.83**	**4,621.55**
Khangai	Arkhangai	-	-	-	5.86	14.59	28.85	10.33	15.18	38.14
	Bayan-Khongor	-	-	-	19.87	122.94	161.31	26.52	40.51	32.70
	Bulgan	9.57	124.14	135.19	394.15	121.98	369.87	98.72	110.22	139.41
	Orkhon	-	-	1.95	16.59	9.57	59.97	21.75	2.47	33.93
	Uvurkhangai	5.10	11.44	207.80	6.73	24.85	41.74	12.32	13.08	18.06
	Khuvsgul	-	-	-	-	-	-	-	-	0.02
TOTAL OF KHANGAI		**14.67**	**135.58**	**344.93**	**443.19**	**293.92**	**661.73**	**169.63**	**181.46**	**262.26**
Central	Gobisumber	2.67	3.94	14.91	-	-	-	3.43	5.31	8.60
	Darkhan-Uul	308.55	54.63	175.01	94.70	84.70	304.24	36.99	64.36	177.34
	Dornogobi	-	1.72	-	-	3.06	-	-	0.05	0.53
	Dundgobi	1.02	4.29	7.03	7.75	0.09	24.37	14.14	5.61	12.32
	Umnugobi	8.71	11.32	11.81	19.19	24.18	16.86	31.01	49.22	73.54
	Selenge	151.57	215.44	596.55	478.67	301.22	756.83	287.86	536.89	599.50
	Tuv	390.26	158.77	503.69	456.75	286.79	73.30	206.43	182.63	774.43
TOTAL OF CENTRAL		**862.79**	**450.11**	**1,309.00**	**1,057.06**	**700.04**	**1,175.60**	**579.85**	**844.07**	**1,646.26**
Eastern	Dornod	0.03	1.20	6.40	3.14	12.64	11.86	4.61	6.45	3.40
	Sukhbaatar	2.64	2.13	6.66	36.81	8.56	19.30	19.83	26.13	15.72
	Khentii	-	-	-	33.74	38.89	72.41	70.30	56.63	81.17
TOTAL OF EASTERN		**2.67**	**3.33**	**13.06**	**73.69**	**60.08**	**103.57**	**94.73**	**89.21**	**100.29**
ULAANBAATAR		**171.53**	**89.51**	**370.27**	**243.43**	**370.03**	**167.75**	**438.02**	**743.06**	**599.22**
GRAND TOTAL		**5,141.30**	**1,427.99**	**4,376.47**	**3,730.26**	**4,679.73**	**5,377.45**	**4,685.12**	**5,979.64**	**7,229.59**

Source: Authors' estimation based on National Statistical Office of Mongolia (NSOM, 2020a).
Note: Percentages in brackets indicate the share of a province or region in total production in Mongolia, at the bottom of the table. The production is estimated that harvested quantity is multiplied by annual average price.

Appendix B. Input cost estimations

Cost of fixed input estimation

We consider four types of capital as fixed inputs: building irrigation canals, fencing, seedlings and other.

Table B.1: Useful lives and salvage values of fixed inputs.

No	Inputs	Useful life (years)	Salvage value
1	Building irrigation canal	100*	0**
2	Fencing	25***	4%***
3	Seedlings	30****	0**
4	Other investment items	10**	0**

Source: *Betty T. Yee (unpublished report, p. 5); **Assumed; ***Government of Mongolia (2005, p. 2-3); ****Li and McLoughlin(1997).

Cost of non-tradable intermediate inputs

Because the input is not exported from or imported to Mongolia, we used the approach called 'standard conversion factor (SCF)' developed by Squire & van der Tak (1975, p. 73)[1] with the following equation:

$$SCF = \frac{M + X}{(M + T_m) + (X - T_x)} \ (\textbf{\textit{Eq. B. 1}}) \text{ adapted from European Union (2008, p. 51)}$$

Standard conversion factor is the ratio of internationally traded goods in border prices (nominator) to its domestic prices (denominator). The domestic price of imported goods paid by consumers equals to total import (M) plus import tax (T_m), on the other hand for exported goods it is equal to total export (X) minus import tax (T_x).

The Eq. B.1 is extended by including subsidy of import (S_m) and export (S_x) in the denominator by European Union (2015, p. 308):

$$SCF = \frac{M + X}{(M + T_m - S_m) + (X - T_x + S_x)} \ (\textbf{\textit{Eq. B. 2}}) \text{ adapted from European Union (2015, p. 308)}$$

In case of Mongolia, SCF is equal to 0.919 (0.914) in 2012 (2013), based on data from National Statistics office, annual budget and financial report, and the Central Bank of Mongolia.

Table B.2: Data to estimate Social Conversion Factor in Mongolia (Million MNT).

Indicators	2012	2013
Import tax (Mt)*	1,375,990.7	1,558,515.7
Export tax (Xt)*	195.2	188.7
Import subsidy (Ms)*	39,446.7	33,998.7
Export subsidy (Xs)	0	0
Import (M)**	9,159,782.4	9,684,118.0
Export (X)**	5,959,723.7	6,511,295.7
SCF (Eq. 4)	**0.919**	**0.914**

Source: * Government of Mongolia (2014, p. 13). ** National Statistical Office of Mongolia (NSOM, 2015). Export and import was reported in US$ in NSOM (2015), hence we converted them into MNT using average annual exchange rate 1 US$=1,359.24 MNT in 2012, and 1,523.93MNT in 2013, reported by the Central Bank of Mongolia.

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[1]Actually the term is not 'standard conversion factor', but 'consumption conversion factor' as written by Squire & van der Tak (1975, p. 73). However, the formula of consumption conversion factor is used in the literature and guides as 'standard conversion factor' for example in "Guide to cost-benefit analysis of investment projects" by the European Union (2008, p. 51).