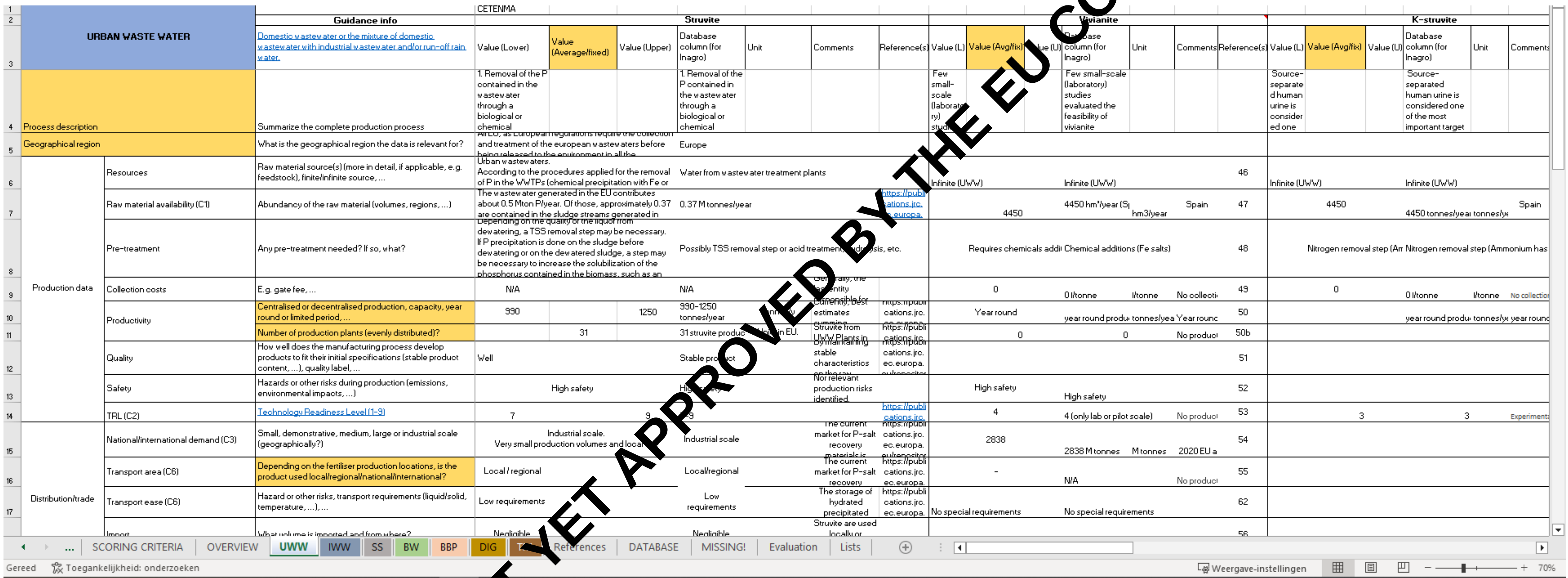
5. Annex



CETENMA

URBAN WASTE WATER		Guidance info: Domestic wastewater or the mixture of domestic wastewater with industrial wastewater and/or run-off rain water.	Struvite: Value (Lower)	Value (Average/fixed)	Value (Upper)	Database column (for Inagro)	Unit	Comments	Reference(s)
Process description		Summarize the complete production process	1. Removal of the P contained in the wastewater through a biological or chemical			1. Removal of the P contained in the wastewater through a biological or chemical			
Geographical region		What is the geographical region the data is relevant for?	All EU, as European regulations require the collection and treatment of the european wastewaters before being released to the environment in all the			Europe			
Production data	Resources	Raw material source(s) (more in detail, if applicable, e.g. feedstock), finite/infinite source, ...	Urban wastewaters. According to the procedures applied for the removal of P in the WWTPs (chemical precipitation with Fe or			Water from wastewater treatment plants			
	Raw material availability (C1)	Abundancy of the raw material (volumes, regions, ...)	The wastewater generated in the EU contributes about 0.5 Mton P/year. Of those, approximately 0.37 are contained in the sludge streams generated in			0.37 M tonnes/year			https://publications.jrc.europa.
	Pre-treatment	Any pre-treatment needed? If so, what?	Depending on the quality of the liquor from dewatering, a TSS removal step may be necessary. If P precipitation is done on the sludge before dewatering or on the dewatered sludge, a step may be necessary to increase the solubilization of the phosphorus contained in the biomass, such as an			Possibly TSS removal step or acid treatment, [illegible], etc.			
	Collection costs	E.g. gate fee, ...	N/A			N/A		Generally, the [illegible]entity responsible for	
	Productivity	Centralised or decentralised production, capacity, year round or limited period, ...	990		1250	990-1250 tonnes/year	[illegible]	Currently, best estimates	https://publications.jrc.
		Number of production plants (evenly distributed)?		31		31 struvite produc[illegible] in EU.		Struvite from UWW Plants in	https://publications.jrc.
	Quality	How well does the manufacturing process develop products to fit their initial specifications (stable product content, ...), quality label, ...	Well			Stable product		By maintaining stable characteristics	https://publications.jrc.ec.europa.
	Safety	Hazards or other risks during production (emissions, environmental impacts, ...)		High safety		High [illegible]		Not relevant production risks identified.	
	TRL (C2)	Technology Readiness Level (1-9)	7		9	[illegible]-9			https://publications.jrc.
Distribution/trade	National/international demand (C3)	Small, demonstrative, medium, large or industrial scale (geographically?)	Industrial scale. Very small production volumes and local			Industrial scale		The current market for P-salt recovery materials is	https://publications.jrc.ec.europa.
	Transport area (C6)	Depending on the fertiliser production locations, is the product used local/regional/national/international?	Local / regional			Local/regional		The current market for P-salt recovery	https://publications.jrc.ec.europa.
	Transport ease (C6)	Hazard or other risks, transport requirements (liquid/solid, temperature, ...), ...	Low requirements			Low requirements		The storage of hydrated precipitated	https://publications.jrc.ec.europa.
	Import	What volume is imported and from where?	Negligible			Negligible		Struvite are used locally or	

Row	Vivianite: Value (L)	Value (Avg/fix)	Value (U)	Database column (for Inagro)	Unit	Comments	Reference(s)	K-struvite: Value (L)	Value (Avg/fix)	Value (U)	Database column (for Inagro)	Unit	Comments
Process description	Few small-scale (laboratory) studi			Few small-scale (laboratory) studies evaluated the feasibility of vivianite				Source-separated human urine is considered one			Source-separated human urine is considered one of the most important target		
Geographical region													
Resources	Infinite (UWW)			Infinite (UWW)			46	Infinite (UWW)			Infinite (UWW)		
Raw material availability (C1)		4450		4450 hm³/year (S	hm3/year	Spain	47		4450		4450 tonnes/year	tonnes/ye	Spain
Pre-treatment		Requires chemicals addi		Chemical additions (Fe salts)			48		Nitrogen removal step (Am		Nitrogen removal step (Ammonium has		
Collection costs		0		0 l/tonne	l/tonne	No collecti	49		0		0 l/tonne	l/tonne	No collection
Productivity		Year round		year round produ	tonnes/yea	Year round	50				year round produ	tonnes/ye	year round
Number of production plants		0		0		No product	50b						
Quality							51						
Safety		High safety		High safety			52						
TRL (C2)		4		4 (only lab or pilot scale)		No product	53		3		3		Experimenta
National/international demand (C3)		2838		2838 M tonnes	M tonnes	2020 EU a	54						
Transport area (C6)		-		N/A		No product	55						
Transport ease (C6)	No special requirements			No special requirements			62						
Import							56						

Figure 7. Screenshot as an example of the data collection template with the different life cycle parameters.