PSILCA results

A comparison of PSILCA SimaPro and PSILCA Starter openLCA May 2016

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1 Introduction: Comparison of features

The PSILCA database is available for openLCA and SimaPro software. However, the versions differ due to the different technical capacities and features of both softwares. Hence, large systems, such as Input/ Output databases – the underlying matrix of PSILCA – cannot be calculated without a cut-off. Further, the specific characteristics of the Professional and Developer variants, especially the raw value and data quality features, cannot be reflected in SimaPro.

Therefore, the PSILCA SimaPro version is similar to the PSILCA Starter variant in openLCA: Social indicators are provided as risk-assessed elementary flows for every process. Further, every dataset contains information about data sources and year of the data point. The cut-off in PSILCA SimaPro, however, is higher than in PSILCA Starter – 1E-4 in SimaPro vs. 1E-5 in Starter – in order to allow calculations in reasonable time.

2 Goal of this text

Because of these differences, especially the higher cut-off in SimaPro, it is important to test how strongly analysis results vary among both softwares. It is, therefore, the goal of this text to compare inventory and impact assessment results calculated for the same product systems with each PSILCA version.

3 Method

To compare analysis results of PSILCA in openLCA and SimaPro, two representative product systems for the industry sector "Agriculture" in Afghanistan and the commodity "Basic Construction" in Germany were calculated in each software without an additional cut-off. Then, inventory and impact assessment results were compared on the basis of absolute values and normalized variation coefficients as a relative dispersion measure. Findings are presented by different visualizations.

4 Results

4.1 Inventory results

Figure 1 – Figure 3 show the inventory results of the selected product systems.

The graphs in Figure 1 display the results of flows, i.e. risk-assessed indicators, over the life cycles of the product systems, measured in worker hours. The blue graphs show results calculated in SimaPro, the orange ones show results of openLCA.



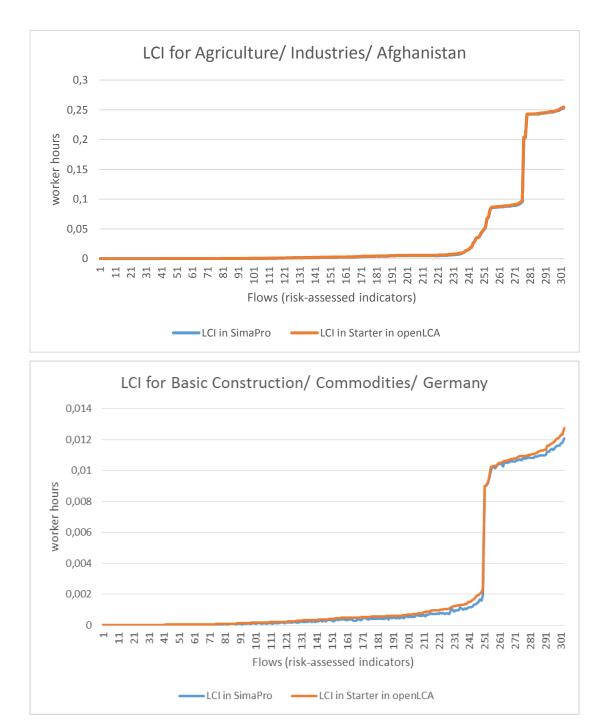


Figure 1: Life cycle inventory for Agriculture/ Industries/ Afghanistan (above) and Basic Construction/ Commodities/ Germany (below)

Both diagrams show that the absolute and relative inventory results do not vary strongly between both soft-wares.

The same findings are illustrated by the colour scales in the following tables (Figure 2) visualizing low values of each software's inventory result scales in dark red and high values in dark green. Only regarding a few cases, especially flows with low worker hours (lower than 9.6 s for "Agriculture" and below 1.75 s for "Basic Construction" in openLCA, respectively) and, hence, low importance of these social risks over the life cycle, the order of inventory results varies slightly between both database versions. This is the case where the colours are different between adjoining values of the softwares.



No Suprance Unit	LCI in StimePro LCI in Starter is	in operACA				
128 Human rights issue h 8d Frequency of Socials 6 Control environment 270 Traffickaryou in persols	1,0000E-15 3,760076-09 6,07648E-08 2,360376-07	2,5000058-12 7,800078-09 8,007988-07 9,100768-07				
276 Public sector corrults 76 Setraction of ones; In 27 DALYs, due to indo's 65 Setraction of Tossel Is	4,286916-07 8,137876-07 7,101886-08 6,71826-08	1,21216E-08 1,81723E-08 2,27981E-08 2,8508SE-08				
115 (Health expenditure In 91 Clender wase asso; In 212 (Public expenditure In 185) Per migration rate; In	1,389426-08 1,370126-08 4,280886-07 1,881146-08	2,700426-00 2,800236-00 3,810066-00 7,362846-00				
23 DALYs due to indo h 273 Unimployment statilh 17 Children in employih 88 Signaction of bearigh	4,561336-06 2,202336-06 7,603436-06 1,00266-05	7,734288-08 8,887198-08 1,383818-08 1,888418-08				
31 Children in employ/h. 99 Headth expenditure in 129 Hamen rights issue/h. 280 Social security esgih.	1,038676-08 1,286626-08 3,141886-08 3,141746-08	2,78114E-08 3,30488E-08 3,8088E-08 3,8421E-08				
287 Workers affected the 88 Setrection of beamin 87 Goods produced by 287 Trade upon density	3,308116-08 3,722086-08 3,923616-08 1,479236-08	4,33412E-OS B,14082E-OS B,28142E-OS B,69287E-OS				
235 Pages of Association 82 Prequency of forocin 282 Weekly hours of win 24 Children in employin	3,011916-08 2,630336-08 3,13656-08 3,765616-08	8,8000006-08 8,807918-08 8,91288-08 8,317198-08				
68 Shiraction of fossil h. 184 Net moration rate: h. 25 Children in employih. 32 Children in employih.	3,983616-06 3,983626-06 3,09366-06 4,37386-06	6,31719E-06 6,31782E-06 6,8043E-06 7,1271E-06				
223 Rate of tase accident 141 literacy rate, sout in 148 treemstoner Migrain 289 Youth literacy rate in	8,862316-08 3,677186-08 3,476826-08 3,078876-08	7,300076-OB 7,6700-05-OB R, 10006-OB R, 602085-OB				
28 Children in employ/h 86 Goods produced b/h 305 Heath expenditure h 363 Level of industrial v/h	6,080466-08 6,120446-08 8,000436-08 6,000476-08	8,627316-08 8,731836-08 0,000114888 0,000128888	lo Substance	Unit	LCI in SimaPro	LCI in Starter in openLCA
22th Rose of non-fasts aith. 1211 Health expenditure, h. 131 littleracy rate, femilih. 1521 International mora h.	0,000111161 R,382346-05 6,382286-05 0,000124489	0,00012808 0,00013878 0,00013878 0,000142734	2 Social security expenditures; very low risk	h	0,001613694	0,001838371
260 Payer of Colection (In 500) Health expenditure (In 560) Level of Industrial vin 116 Health expenditure (In	8,084298-06 8,08416-06 8,08016-06 0,000127834	0.000180994	0 Extraction of biomass (related to population); medium risk	h	0,001481849	0,001884375
82 Balaction of Learning BD Balaction of ones in 289 Youth Blandary said in 114 Health expenditure in	0,00013874 0,000113878 0,000138843 8,863176-06	0,000181888	Public expenditure on education; medium risk	h	0,001656251	0,001901785
108 Health expenditure in 120 Health expenditure in 101 Health expenditure in 84 Setroction of fosset in	0,000108881 0,000188194 8,862016-06 0,000160083	0.000010019		h	0,001030231	0,001947532
174 Montan wage, pells 208 Public expenditure in 258 Standard coverage in 286 Workers affected (in	0,00016899 0,00018912 0,00016888 0,000180888	0,000030374	8 Youth illiteracy rate, male; very low risk			· · · · · · · · · · · · · · · · · · ·
21 Children in employ in 21 Children in employ in 381 Net migration rate. In 327 litteracy rate, mate in	0,000100221 0,000171887 0,000108845 0,000198877		9 Sanitation coverage; no data	h	0,001920911	0,001960746
79 Sidraction of ones; In 13 Children in emality In 155 International may all	0,000181387 0,00023998 0,000231855	0.0000190003	5 Minimum wage, per month; low risk	h	0,001317756	0,001973842
100 Hatraction of bearuin 110 Heath expenditure in 211 Public expenditure in	0,000201405 0,00000004 0,000042118	0,00000386386	6 Frequency of forced labour; very low risk	h	0,001672012	0,001997979
no selection within court 1229 Fearmen rights issued in 2811 Youth illineacy rate in 2725 University ment rate in 87 Bywenton of trees."	0,000178812 0,000178803 0,00028803 0,000281488	0,00008/7768	3 Extraction of biomass (related to area); low risk	h	0,001562196	0,002028308
148 International Mora in 78 Baraction of ones, in 140 Baraction of ones, in 247 Santation covera-*	0,000382747 0,000386488 0,000380338 0,000380372	O CODATEDET	1 Drinking water coverage; low risk	h	0,001759061	0,002047654
218 Pubbs sector corrult 213 Pubbs sector corrult 84 Goods croduced bit 183 Net regresor rate, in	0,0000EMEXXX 0,0000EMEXTAZ 0,0000EAMEX 0,0000EMEXTS	O,OCOMMUNICALS	3 Youth illiteracy rate, total; very low risk	h	0,001724219	0,002172322
7 Certified environments 40 Directions water covers 182 Net migration rate (in 281) Standard coveragilis	0,000030897 0,000030948 0,000039851 0,0004953	0,000473090 0,00047307 0,00061790 0,000817913	5 Trade union density; medium risk	h	0,00181706	0,002213758
19.1 International moralin 38 DALYs due to indo/h 288 Yathbang in persoln 283 Workers affected th	0,000388213 0,000380038 0,00038103 0,00082834	0,000024801 0,000024808 0,000024888 0,000024888	4 Trade union density; low risk	h	0,001694279	0,002233165
71 Bidrackon of Industria 132 Bibracky rate, fernilis 15th Level of Industrial vis 238 Right of Collective (s.	0,000 EX1122 0,000 EX1122 0,000 EX1122 0,000 EX1122 0,000 EX1122 0,000 EX1122 0,000 EX1122	0,0000073811 0,00000000000 0,000000000000	7 Level of industrial water use (related to total withdrawal); very high risk	h	0,001727841	0,002233461
377 Unerchan of beardin 277 Unerchaptoyment ratelli 6 Active involvement in 177 Molman whole, sech.	0,00048891 0,00039648 0,00039658 0,00098821	0,000881198 0,00088131 0,000883131 0,0007288	7 Social security expenditures; high risk	h	0,001765785	0,002277957
260 Pope to Street veryls 70 Stateston of Indust Is 507 Health expension in	Q,00081188 Q,000891161 Q,000686	0,0007240806 0,000742472 0,000772023 18	8 Pollution level of the country; low risk	h	0,001944871	0,00229482
231 Pegits of Association in 231 Pegits of Association 118 Health expensions in	0,000 (000 11 0,000 770 (000 0,000 770 (222	0,00080/88023 0,00080/88027 0,00080/87027	6 Children in employment, female; no risk	h	0,001928265	0,002413117
73 Sidraction of industria 8 Contribed environments 2803 Youth Stheracy used in 1381 Steeper 1884 - 1884 in	0,0007051706 0,000706138 0,000706132 0,00088122 0,000881233	0,0008002389	3 Children in employment, male; no risk	h	0,002108632	0,002414063
1 Active involvement in 278 Rose of non-table at in 88 Conner wage gap, in 11 Contined environment	0,00083988 0,000987984 0,00108828 0,001188148	0,00116128	O Children in employment, total; no risk	h	0,00180403	0,002425797
274 Liverysbyment rate(h. 171 Living wage, per mih. 146 International Moralh. b) Active involvement (h.	0,001171261 0,000788838 0,00102779 0,001217804	O, OCT 2800CST O, OCT 28CTMCS O, OCT 38C40CT O, OCT 38C3TCZ			-,	-,
76 Exect of industrial vin 76 Execution of industrial 227 Pate of non-task ach	0,001288288 0,001283884 0,001381048 0,001381048	0,0014800085 0,0011800811 0,0014800088 0,0014800088				
202 Social security each 80 Setraction of bearing 210 Public expenditure in 200 Youth (Seracy sect)	0,001 613656 0,001 681865 0,001 686251 0,001 686708	0,001804EFB 0,001804EFB 0,001801FBB 0,00184FBEE				
250 Santiblion coveragili 173 Mnimum wage, pelh 86 Presidency of Sonoth 53 Satraction of beam/h	0,001100911 0,001317788 0,001072012 0,001862198	0,001867862 0,001867862 0,001867878 0,000008888				
41 Directions water coordinates of the coordinates	0,0017M0001 0,0017M219 0,00181706 0,001896279	0,000172002 0,000213708 0,000213708 0,000203180				
287 Social security eight 188 Poblison teet of Svin 16 Children in employin 23 Children in employin	0,001768788 0,00186871 0,00182888 0,00188832	0,000077987 0,000078802 0,000013177 0,000013010				
301 Youth Warday sat/h 301 Youth Warday sat/h 301 DALYs due to mooth	Q,00180903 Q,00236281 Q,0022711	0,00040WPRF 0,000H6944 0,000H6XXXII				
569 Living wage, per min 34 DALYs due to indo h 93 Gender wase sao: In 272 Trafficking in periols	0,000779884 0,000789878 0,000787791 0,000716718	0,000####### 0,000###### 0,000###### 0,000######				
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28 Children in emission in 15 Children in employ in 22 Children in employ in 172 Upon water, per min	0,004189438 0,004216917 0,000189629 0,004169635	0,004/85/2008 0,004/95/1781 0,004/94/95/4 0,004/95/178				
130 Blancky rain, femilin 100 Health expenditure in 2 Author Involvement in 126 Harvan rights Haurin	0,0041740747 0,004034984 0,0041728334 0,00391878	0,004804788 0,0048078841 0,0048010802				
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122 Health expenditure in 271 Trafficking in person 135 Bleezery rate, male in	0,008-067412 0,008-06988 0,008-06983	O, COSIGNOSIS O, COSIGNOSIS O, COSIGNOSIS				
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176 Minimum wage, pelh. 232 Pages of Association 266 Sentiation coverage. 261 Pages to Street High	0,008/02/12/1 0,008/02/82 0,008/02/6/83 0,008/02/87/48	O, OCRIN-EZIKUR O, OCRIN-EZIKUR O, OCRIN-E-RINK O, OCRIN-RINK				
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51 Invitation of violation 200 Presente of insign in 100 Health extenditure in 80 Conder wage gap, in	0,006/09/0396 0,006/00/215 0,006/07/96/16 0,006/07/96/16	O, COMMENTS O, COM				
40 Sindence of victorich 200 Presence of sufficin 48 Sindence of victorich 180 Presence of anti-cin	O, COMMUNISON O, COMMUNICON O,	O, OCOMBUNITOR O, OCOMBUNICIP O, OCOMBUNICIP O, OCOMBUNICIP				
278 Literatoveners rate in 2003 Trade union densit in 87 Cender wage gap. In 236 Fours of Association 1989 Presents of Association	O, COCAMITTAL O,	O, CORROTATO O, CORROTATO O, CORROTATO O, CORROTATO				
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And in Section of the Committee of the C	0,013181862 0,014868825 0,01478687 0,018111089	0,013X7480N 0,014747NH 0,0148ND127 0,018ND0901				
284 Youth illteracy rately						
219 Fase of task accident 207 Presence of sufficient 173 Livina wase, per min	0,018998273 0,009882143 0,009887782 0,009887982	0,018071868 0,008660777 0,0091308603 0,00819-8868				

a) Inventory results for Agriculture/ Industries/ Afghanistan



Mo Substance Until 1 226 Numan rights In 9 Certified evol In 86 Frequency of In 270 Traffishing in In	LCI in StraPes LCI in States i 3,689016-16 3,689116-00 3,999148-08	1,21877-18 4,14836-10 2,2836-07 2,44856-07				
256 Publis section is 315 Near He respect to 316 DAN's Size for Is 37 DAN's short to Is 285 Net respective is 285 Net respective is	(CRINE OR 8,41164 OR 1,4778 O7 2,80079 O7 1,085376 O7 1,88578 O7	2,469420-07 3,038660-07 3,780620-07 5,388661-07 5,749570-07 1,036270-08	No Collections	11-16	I CI I - CI D	LCLIe Charter in annu LCA
99 Health regery b 233 Health regery b 76 Estration of b 293 Publishes Inco b 38 DASY, she to b	1,84818-07 8,942788-07 8,789888-07 8,882488-07 1,802818-06	1,05505E-OR 1,10586E-OR 1,1719W-OR 2,20886E-OR 2,2103E-OR	No Substance 168 Level of industrial water use (related to total withdrawal); very low risk	Unit	0,000206551	LCI in Starter in openLCA 0,000315931
97 Goods people by 312 Polds expend by 323 Mea Sh expend by 303 Mea Sh expend by 352 International by	9,62307F-07 1,3316F-08 1,6778F-08 2,26216F-08 2,86216F-08	3,503170-06 3,550990-06 4,404268-06 6,394670-06 6,417720-06	187 Pollution level of the country; high risk	h	0,000265865	0,000317089
380 Level of Indus h 68 Extraction of h 61 Extraction of h 73 Extraction of h 114 Health expens h	2,812.60	7,828816-OE 9,95596-OE 1,042216-OS 1,19516-OS 1,209916-OS	193 Presence of anti-competitive behaviour; high risk	h	0,000233126	0,000328163
338 Health respond to 320 Health respond to 231 Public respond to 36 DAX's short to to 55 Entraction of to	#,30096F-06 4,3336F-06 6,3956F-06 9,8827F-06 #,5988F-06	1,220181-05 1,282091-05 1,112081-05 1,478121-05 1,556111-05	42 Drinking water coverage; medium risk	h	0,000198865	0,000330035
283 Net minister h 287 Yearth Blesses h 123 Health manns h 80 Editarition of h 281 Youth Blesses h	1,000084-05 7,141546-06 7,141746-06 6,791246-06 1,872916-05	1,88328-05 1,78828-05 1,788376-05 1,8438-05 1,857176-05	107 Health expenditure, out-of-pocket; medium risk 75 Extraction of industrial and construction minerals; very low risk	h	0,000292084	0,000331973
24 Children in en h 24 Children in en h 299 Yauth illiena h 44 Crinking wate h 31 Children in en h	8,700,800 GB 8,82180 GB 1,868070 GB 1,068070 GB	2,001516-05 2,001516-05 2,08669-05 2,18456-05 2,20609-05	133 Illiteracy rate, female; very high risk	h h	0,000210118 0,000227082	0,000334712 0,00033525
27 Children in exit to 221 Planan rights b 26 Children in exit to 25 Children in exit to 25 Children in exit to 27 Children in exit to 27 Children in exit to 28	1,714831-05 1,11477-05 1,08031-05 1,08031-05	2,854874-05 2,428082-05 2,498082-05 2,4980-05 2,4980-05	228 Rate of non-fatal accidents at workplace; no data	h	0,0002408	0,000340731
58 Extraction of h 285 Right of Joseph 289 Yandh (Bloom h 12 Children in h 233 Staff of Joseph	1,721,990 -05 1,000,677 -05 1,877,880 -05 1,813,870 -05	2,5700 M - OS 2,5951 M - OS 2,7176 M - OS 2,8100 M - OS 2,8400 M - OS	83 Frequency of forced labour; medium risk	h	0,000291367	0,000344797
233 Raths of Colle Is 243 Raths to Strike Is 284 Net regarder Is 25 Children in erc Is 32 Children in erc Is	1,677428-05 1,677428-05 1,611428-05 2,16208-05 1,89888-05	2,852918-05 2,852918-05 3,040818-05 3,236098-05 3,413178-05	178 Minimum wage, per month; very high risk	h	0,000298978	0,000346162
45 Devolving water in 223 Rater of Fatal in 260 Social security in 268 Santilation on in 129 Haman rights in	1,5226-05 1,45866-05 1,03286-05 1,88316-05 1,84586-05	3,47738E-OS 3,6373 E-OS 3,74078E-OS 3,7706 E-OS 3,86682E-OS	117 Health expenditure, total; high risk	h h	0,000248352 0,000314598	0,000358711 0,000364294
335 Inhealth respons to 95 Connect periodic to 366 Indervasitional to 270 Living wage, p. to 343 Illientary rate to	2,62230-00 8,682768-00 8,082768-00 8,32238-00	4,271316-05 4,3409-05 4,443316-05 4,433316-05 4,387226-05	143 Illiteracy rate, total; very high risk 280 Weekly hours of work per employee; low risk	h	0,000314398	0,000367953
57 Estraction of h 28 Children in red h 801 Youth (Blesse h 22 Estraction of h 97 Estraction of h	2,427044-05 2,627044-05 2,62944-05 3,638746-05 3,828746-05	5,14688-05 5,213820-05 5,46388-05 5,46388-05 5,49368-05	3 Active involvement of enterprises in corruption and bribery; no data	h	0,000309364	0,00037795
117 Illiensky rate b 271 Trafficking in b 278 Unersplayme b 271 Unersplayme b 300 Youth Illiens b	2,81098-05 4,42299-05 4,1178-05 4,81687-05 4,43692-05	5,913316-05 6,33476-05 6,446596-05 6,535896-05	200 Presence of indigenous population; medium risk	h	0,000322087	0,000400909
286 Youth illiteral b 264 Trade unitin d b 313 illiteracy rate b 41 Orining wate b 13 Children in rol b	4,708814-05 1,708274-05 4,2464-05 5,52734-05 4,44998-05	6,7174E-OS 7,17132E-OS 7,78164E-OS 8,10721E-OS 8,18417E-OS	60 Extraction of biomass (related to population); medium risk	h	0,000326939	0,000405641
280 Warkers affer In 259 Social securit In 155 (Bleesey rate In 221 Auto of Facility In 260 Sevel of Irobot In	7,100/MR OS 6,869/MR OS 7,324/MR OS 6,323/MR OS 5,824/718-05	8,47838E-05 8,50389E-05 9,42262E-05 9,54309E-05 9,70796E-05	222 Rate of fatal accidents at workplace; no data	h	0,000315466	0,000414114
220 Rate of next b 363 Level of index b 29 Estration of b 21 Children in ex b 174 Minimum way b	7,892728-05 7,677998-05 9,78899-05 6,000.098-05 7,856488-05	0,000008475 0,0000146641 0,000023896 0,000024154 0,000024838	109 Health expenditure, out-of-pocket; very high risk 104 Health expenditure, external resources; very low risk	h h	0,000255995 0,000328354	0,000418038 0,000437302
238 Public sector (b) 209 Public repress b 380 Net regional b 380 Sight of Colle b 347 Infernational b	#,025986-05 9,00266-05 0,002166-05 9,16296-05 9,82086-05	0,000128804 0,000128997 0,000117406 0,000118535 0,000149771	77 Extraction of ores; low risk	h	0,000328334	0,000437302
177 Minimum way b 364 Level of index b 368 international b 360 illensity rate b 220 Sate of next b	0,00011998 0,000109387 8,172586-05 0,000123878 0,000146986	0,00011022 0,00051201 0,00051866 0,00051866 0,000519067	29 Children in employment, total; no data	h	0,000307849	0,000443832
85 Prequency of In 362 Level of India Is 285 Youth Illinois Is 358 Level of India Is 367 Sanitation on Is	0,000108233 0,000101394 0,000130869 0,000129838 0,338388-06	0,000081602 0,000083338 0,000088161 0,000088974 0,000087173	15 Children in employment, female; no data	h	0,000356636	0,000452538
62 Estraction of b 255 Sector average b 126 Minimum was b 55 Estraction of b 267 Warders affec b	0,00013431 0,000129888 0,000111984 0,000101286 0,00018869	0,0000 70541 0,000081192 0,000088718 0,000097153 0,000098559	22 Children in employment, male; no data	h	0,000355893	0,000460813
74 Entestion of In 200 Youth Elevan In 355 International In 200 Traffiching to In 362 Net migrature In	0,00010318 0,000129884 0,000189883 0,000148798 0,000141285	0,000099869 0,000203067 0,000203083 0,00020583 0,000206922	175 Minimum wage, per month; low risk	h	0,000363501	0,000461381
64 Estration of b. 220 Nate of Falai (b. 251 Enter averagh 116 Health expend b. 206 Presence of b.b.	Q00016607 Q000126119 Q000186152 Q000171114 Q000188872	0,000210241 0,00021879 0,000220182 0,000220886 0,000225055	208 Public expenditure on education; high risk 130 Illiteracy rate, female; high risk	h h	0,000388675 0,000323967	0,000462009 0,000466631
200 Transe union of b: 273 Living wage, p b: 383 Indexecution b: 383 Indexecutional b: 202 Transe union of b:	0,000183959 0,000180801 0,00018085 0,000210701 0,000177154	0,000238571 0,000289616 0,00028713 0,000257206 0,00026547	111 Health expenditure, public; high risk	h	0,000323907	0,000470731
232 Raths of Assaults 232 PathAtlant lave In 289 PathAtlant lave In 237 PathAtlant lave In 232 Social security In	0,000163794 0,000311116 0,000319103 0,00031911	0,000287843 0,00027855 0,00028066 0,000928192 0,000928886	250 Sanitation coverage; very high risk	h	0,000369114	0,000478488
358 Level of index is 358 Polision level is 387 Polision level is 383 Presence of a ls 42 Direking water is	0,000206751 0,0002067865 0,000235136 0,000198865	0,000815931 0,000817089 0,000828168 0,000830035	276 Unemployment rate in the country; no data	h	0,000370301	0,000481241
207 Health regered by 73 Satraction of by 333 Stensoy rate by 228 Sate of near 5 by 83 Frequency of by	0,000310384 0,000310118 0,000327083 0,0003408 0,000211367	0,000831978 0,000836712 0,00083525 0,000892781 0,000846797	69 Extraction of fossil fuels; very low risk	h	0,000370663	0,000482997
278 Minimum way b 127 Health expens b 143 Hiterary rate b 280 Weekly bases b 3 Autor involve b	0,000348778 0,000385473 0,0003854848 0,000387779 0,000399864	0,000848162 0,000858711 0,000864294 0,000867953 0,00087795	63 Extraction of biomass (related to population); very low risk	h	0,000264746	0,000486264
200 Presente of it is 60 Estraction of is 222 Rate of fatal is 309 Health respends 200 Health respends	Q000130476 Q000130486 Q000135446 Q000335965 Q00033554	0,000630909 0,000625641 0,000614114 0,000619083 0,000619083	230 Rate of non-fatal accidents at workplace; very low risk 219 Rate of fatal accidents at workplace; high risk	h h	0,000264746 0,000264746	0,000486264 0,000486264
29 Children in exi b 15 Children in exi b 22 Children in exi b 23 Children in exi b 27 Minimum way b	Q000007840 Q000005646 Q000056860 Q000056860	0,000459833 0,000452538 0,000460818 0,00046383	213 Nate of latar accidents at workplace, high risk		0,000204740	0,000400204
150 (Blanco y rate In 111 Health expens In 250 Sanda Hor can In 270 Unersplayed In	Q000128967 Q000128474 Q000189114 Q000170301	0,000464631 0,000470781 0,000478488 0,000483241				
63 Estraction of h 200 Sale of core! h 210 Sale of fals! h 227 Uneroplayers h	0,000264746 0,000264746 0,000264746 0,000176014	0,000484264 0,000484264 0,000484264				
292 Yanuth Illianus Is 322 Yanuth Illianus Is 125 Haman rights Is 5. Estration of Is 35 CALYs she to Is	0,000180097 0,00014185 0,00010142 0,00017204 0,000997888	0,00051875 0,000516599 0,000521192 0,000528631 0,000524169				
93 Genetary wage Is 113 Mea Sh respect Is 110 Mea Sh respect Is 200 Sanita Shor can Is	0,000429487 0,000399871 0,000393188 0,000391281	0,000528986 0,00053857 0,000589622 0,000543517				
228 Human rights In 228 Human rights In 25.2 Sector average In 60 Drinking water In 23.5 Public sector (In	0,00041097 0,00041097 0,000419372 0,00041988 0,000898887	0,00011105 0,000110211 0,000110712 0,000110712				
273 Union water, s h 284 Youth (Bitman h 10 Certified evel h 209 Sanitation on h 242 Sanitation on h	0,000443175 0,000468766 0,00046435 0,000462748 0,00046274	0,000545434 0,000587188 0,000588037 0,000993866				
152 Illiteracy rate b: 27 Children in rec b: 95 Connds produc b: 54 Estraction of b: 54 DAYs shorts b:	Q000479988 Q000479444 Q000489423 Q000489429 Q000447972	0,000801822 0,000808791 0,000807801 0,000807942 0,000818778				
350 International In 357 Social security In 265 Trade union 6 to 275 Uneroployme In 90 Gender wage In	0,000813479 0,000513056 0,000688131 0,000548772 0,000587055	0,000615439 0,000629586 0,000642687 0,000655451 0,000664729				
223 Health expend to 284 Warters after to 342 Wilenacy rate to 342 Children in end to 20 Children in end to	Q000518727 Q000518127 Q000500246 Q000519827 Q000517184	0,000672113 0,000679131 0,000687875 0,00069198 0,00070034				
47 Evidence of w h. 368 Trafficking in h. 327 Rate of new f h. 397 Presence of a h. 5 Active involve h.	Q000633814 Q000635449 Q00060633 Q00060633	0,00078038 0,000787845 0,000787896 0,000758156 0,000778502				
an Public sector (b. 88 Geneler wage b. 78 Extraction of b. 287 Eight of Colle b. 93 Geneler wage b.	Q,000637099 Q,00057342 Q,000670361 Q,000672763 Q,000735645	0,000827636 0,000843818 0,0008613 0,000871436 0,000879813				
283 Warkers affer b 283 Warkers affer b 299 Presente of a b 250 International b 7 Certified evol b	Q000717189 Q000717189 Q000717188 Q000717888	0,000918298 0,000918298 0,0009177 0,00091179				
207 Preserve of v b 40 Evidence of v b 272 Union water, s b 91 Cannot seade b 254 Sector system	Q,000796869 Q,00079685 Q,000781695 Q,0007786979	0,003031518 0,0030304143 0,00303151515 0,00303151608 0,00303031608				
48 Evidence of u b 245 Right to Stoke b 256 Percence of a b 251 Level of traba b 270 Estration of b	Q00078883 Q00078131 Q00008808 Q00003808 Q00003802	0,003341466 0,003354854 0,001152627 0,00118479 0,001223351				
53 Evidence of v b 11 Certified eavi b 288 Presence of a b 233 Sphi of Assau b 233 Presence of v b	Q,0009 \$4409 Q,0009\$4157 Q,0009\$4437 Q,001\$17979 Q,000337338	0,003248635 0,003263445 0,003264573 0,003295329 0,003932789				
262 Social security is 203 Preserve of a is 279 Weekly Insent is 50 Vedence of a is 333 Indernational is	Q,000993744 Q,00107982 Q,001033334 Q,001103384 Q,001134304	0,001938105 0,001939922 0,00191094 0,00047787 0,0011417				
202 Preserve of u b 88 Gender wase b 2 delive involve b 87 Gender wase b 8 Cartified every b	Q00110M08 Q001208142 Q001871071 Q00187708 Q00187788	0,00319911 0,00049687 0,003479965 0,003788128 0,003907051				
2 Active involve b: 285 Percence of a b: 341 Right to Strike b: 96 Genek people b: 354 Indernational b:	QDD0491399 QDD0477379 QDD0483801 QDD0484844 QDD08844333	0,002963107 0,002315461 0,00212623 0,002374577 0,009028624				
33 Extraction of In 380 Met migration In 288 Warkers affec In 283 Yanghi Bibesa In 833 Yanghi Bibesa In	Q,DD8974098 Q,DD9181869 Q,DD9419533 Q,DD9977223 Q,D39226684	0,009019848 0,009216848 0,009523493 0,030234867 0,030250462				
298 Youth illiteral b. 39 DALYs sher be 263 Trade union of b. 59 Edization of b. 254 Right of Assas b.	Q202296011 Q20031879 Q200931786 Q20083149 Q200618096	0,032086913 0,030810180 0,0308868 0,03368988 0,033688761				
256 Section aversal h 256 Marks of Colle h 256 Presence of a h 113 Health respect h 261 Weekly house, h	Q,03346623 Q,00373283 Q,00359627 Q,033596483 Q,03316643	0,030910879 0,03090064 0,03082914 0,030830813 0,030841728				
239 Right of Colle b 244 Minute years b 259 Right of Colle b 264 Minute years b 65 Evolves of w b 254 Minute years	Q00049047 Q00049047 Q000490476 Q000490476	0,010718104 0,010718104 0,010781242 0,010781242				
272 Unexployme b 273 Unexployme b 203 Health regent b 224 Rate of fatal b 72 Estration of b	Q020054684 Q020747195 Q02060728 Q020738967	0,00089899 0,00081878 0,000818632 0,000818632				
an pregunting of bit 277 Practicularly by bit 227 Marrian rights bit 201 Preserve of bit bit 201 Driving wage, g bit 10 Class Const.	Q000788997 Q000788997 Q00088899 Q000889997	0,010928279 0,010928279 0,010987811 0,012018128 0,01108289				
23 Children in on h 30 Children in on h 45 Divining water h 264 Tight to bidde h 56 Extraction of h	0,000818489 0,00089117 0,00087818 0,00087818 0,0008746	0,01309811 0,013098716 0,013182728 0,013182728 0,013282678				
66 Extraction of Is 367 Level of Inducts 368 Publisher level is 308 Health expens is 253 Sandarism	Q,039881057 Q,039881778 Q,039881661 Q,011018161 Q,011018161	0,011279835 0,011291961 0,01121968 0,01127908				
6 Certified exvi b 361 International b 179 Minimum way b 118 Health expend b 258 Social security b	Q011192514 Q011512535 Q011612006 Q011515904 Q011690931	0,01160507 0,011675388 0,011772137 0,01180606 0,013928309				
d Autive involve is 201 Presence of a la 201 Event of India is 91 Geoder wase is 223 Sain of poor like	QD11543096 QD11611559 QD1161154 QD1177793 QD11813793	0,012018861 0,01204299 0,012148648 0,012801704 0,012812149	b) Inventory results for Basic Construction/ Com	mod	ities/ Germ	any
254 Public sector (h	9,0120,80184	0,01275.5188				

Figure 2: Life cycle inventory for Agriculture/ Industries/ Afghanistan (a) and Basic Construction/ Commodities/ Germany (b). Colour scales show range of values for SimaPro (l.) and openLCA (r.)

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This is underpinned by the normalized variation coefficients (= standard deviation/ mean value) of the respective values of each flow (see Figure 3). In 80% of the inventory results of "Agriculture" and 70% of the "Construction" results the variation coefficient is below 0.2.

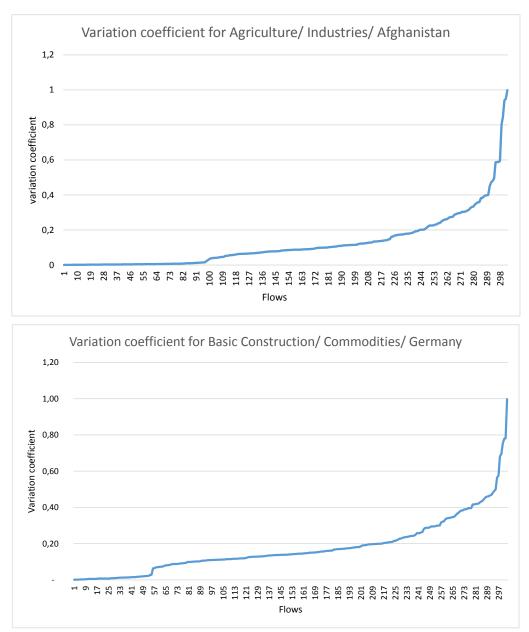


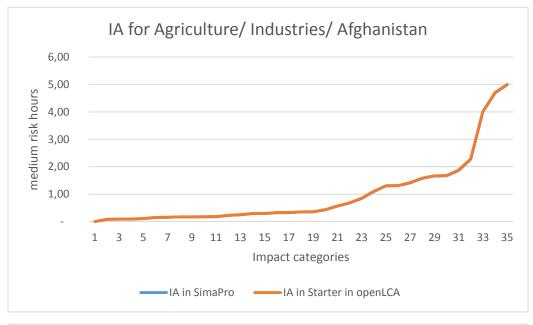
Figure 3: Variation coefficients of inventory results of both softwares for Agriculture/ Industries/ Afghanistan (above) and Basic Construction/ Commodities/ Germany (below)

4.2 Impact Assessment

Figure 4 and Figure 5 show the results of impact assessment for the same product systems.

The graphs in Figure 4 illustrate that also the results of impact assessment differ only very slightly between both PSILCA versions. This refers to the absolute values as well as to the order of impact categories in each software.





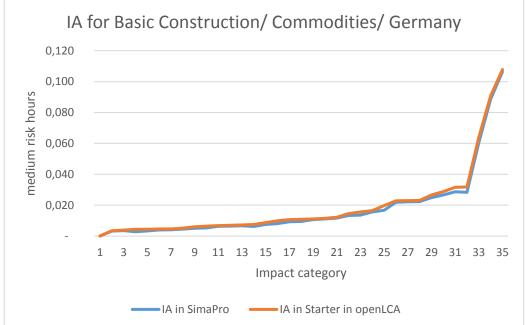


Figure 4: Impact Assessment calculated with both softwares for Agriculture/ Industries/ Afghanistan (above) and Basic Construction/ Commodities/ Germany (below)

The calculation of the variation coefficients of data for each impact category confirm these findings. For "Agriculture" in Afghanistan the coefficient is always below 0.015 and for "Basic construction" in Germany it doesn't exceed 0.21, so much lower than for the inventory results. This means that absolute values of impact assessment vary very slightly (see Figure 5).



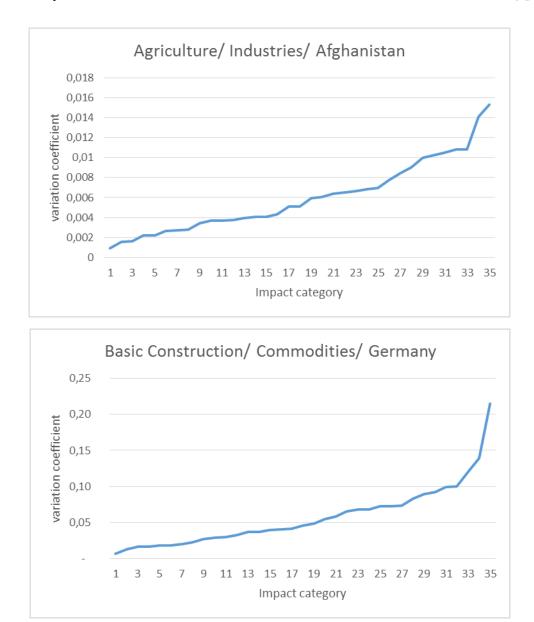


Figure 5: Variation coefficients of impact assessment of both softwares for Agriculture/ Industries/ Afghanistan (above) and Basic Construction/ Commodities/ Germany (below)

5 Conclusion

The analysis of inventory and impact assessment results calculated for the product systems "Agriculture/ Industries/ Afghanistan" and "Basic construction/ Commodities/ Germany" with PSILCA SimaPro and PSILCA Starter (in openLCA) shows that – despite the different cut-off criterion – results are very similar.

While the absolute values of inventory results vary slightly for some flows with low importance regarding their overall working time across the life cycle, results of impact assessment are almost the same between SimaPro and openLCA. This applies both to absolute and to relative values (i.e. order of impact categories).

Therefore, both PSILCA versions can be used to calculate inventory results and impacts. Outcomes are equally reliable.