

# PSILCA results

A comparison of PSILCA SimaPro and PSILCA Starter openLCA

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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

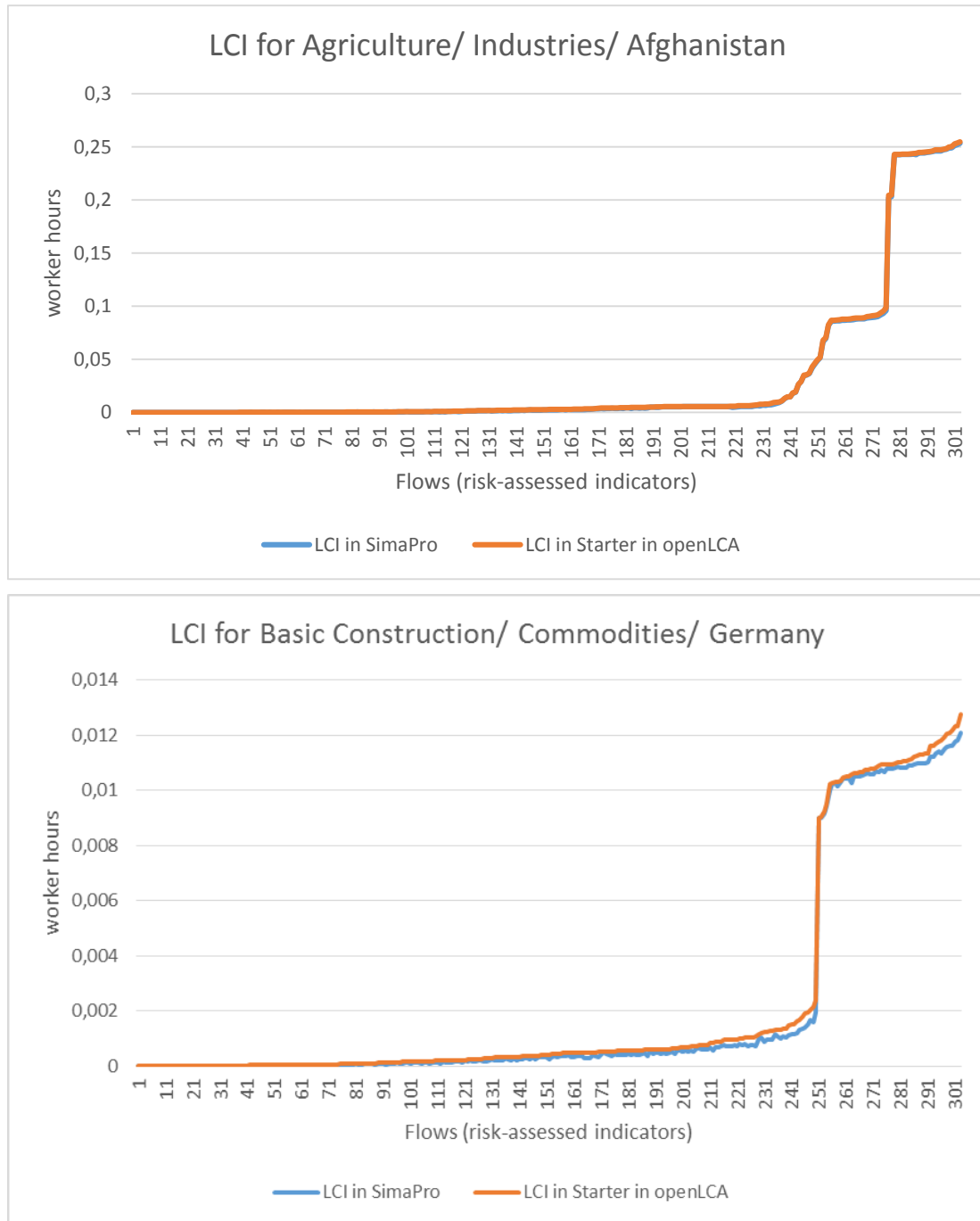
To compare analysis results of PSILCA in openLCA and SimaPro, two representative product systems for the industry sector “Agriculture” in Afghanistan and the commodity “Basic Construction” in Germany were calculated in each software without an additional cut-off. Then, inventory and impact assessment 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.

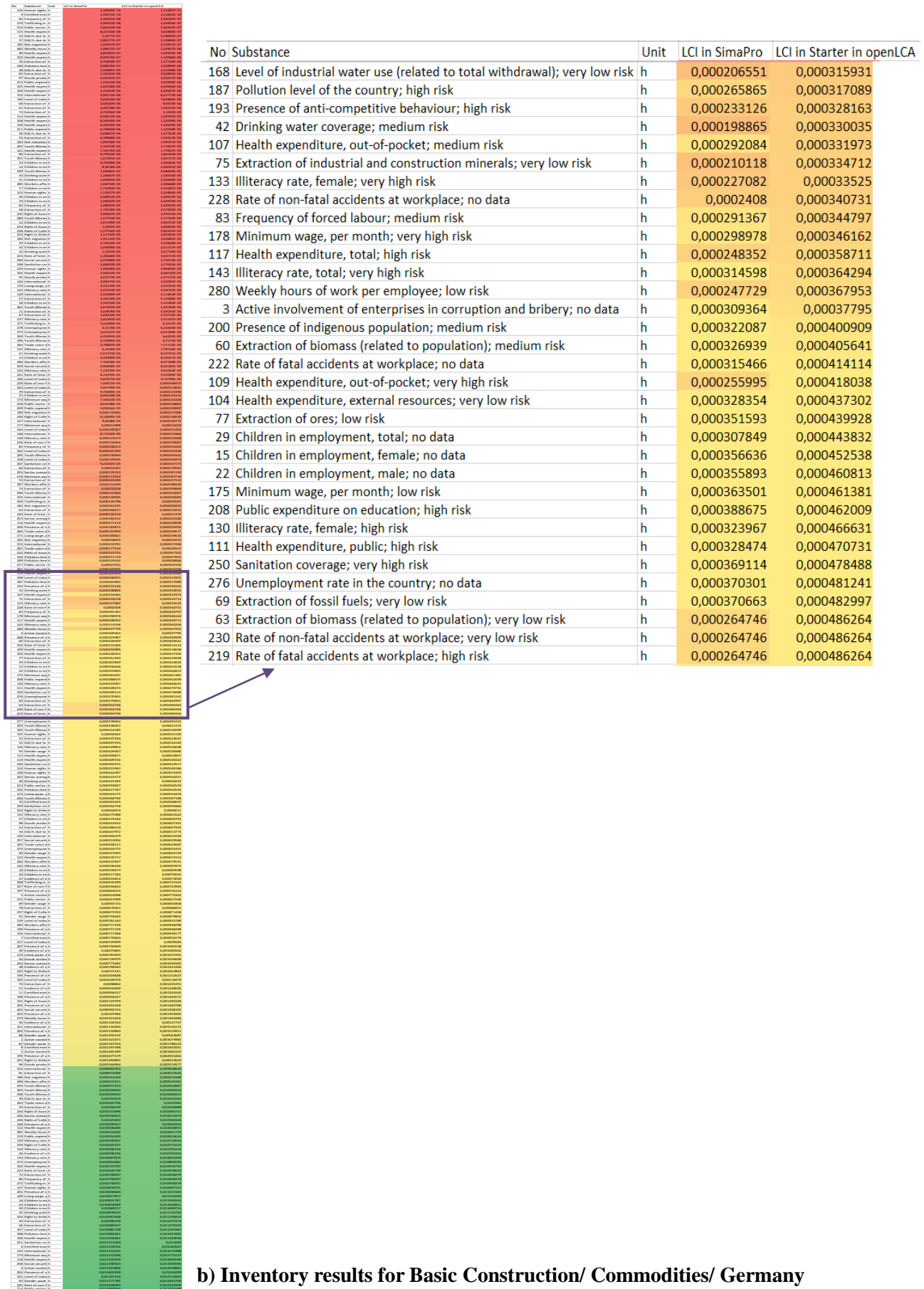


**Figure 1: Life cycle inventory for Agriculture/ Industries/ Afghanistan (above) and Basic Construction/ Commodities/ Germany (below)**

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.

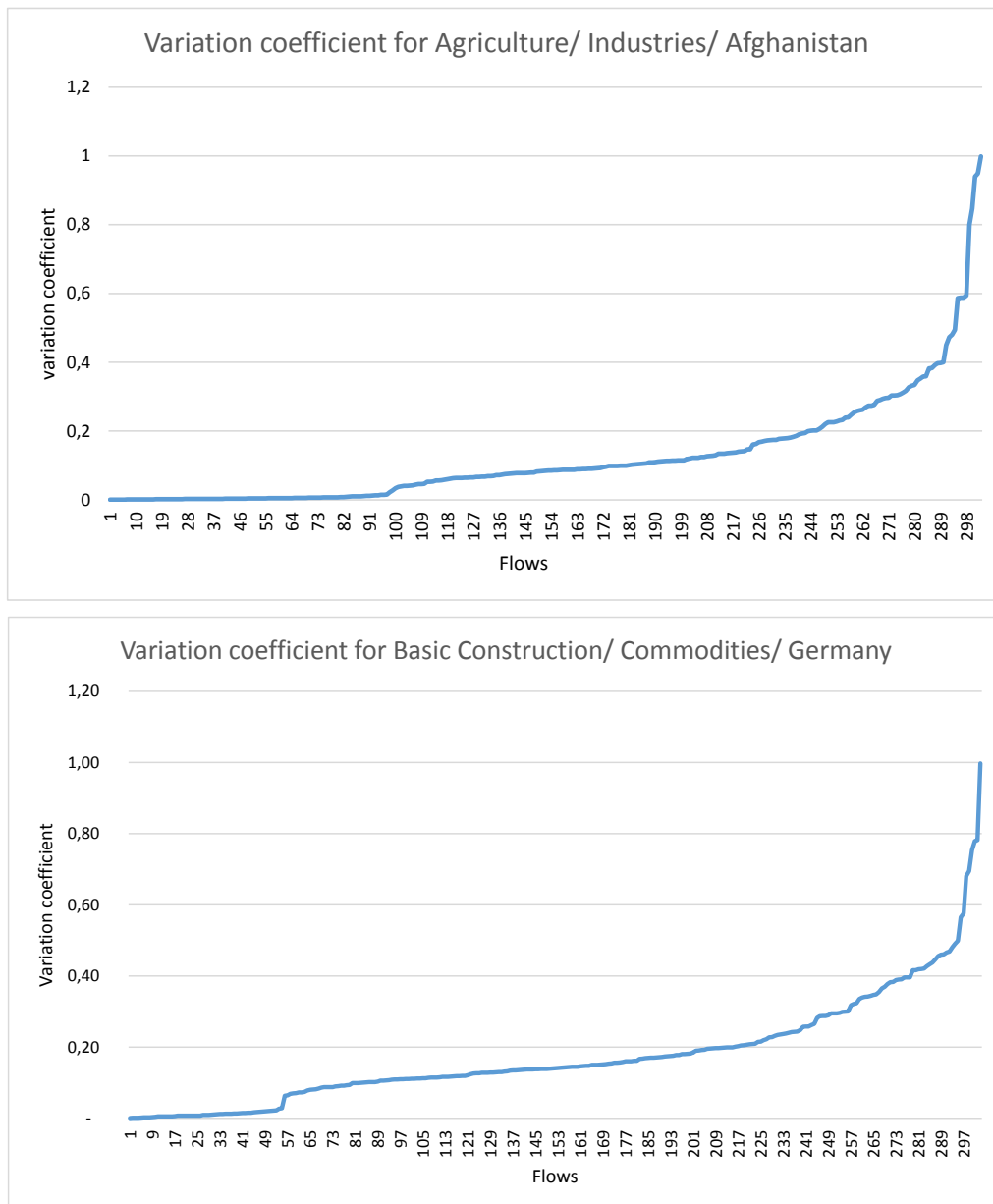




b) Inventory results for Basic Construction/ Commodities/ Germany

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)

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.

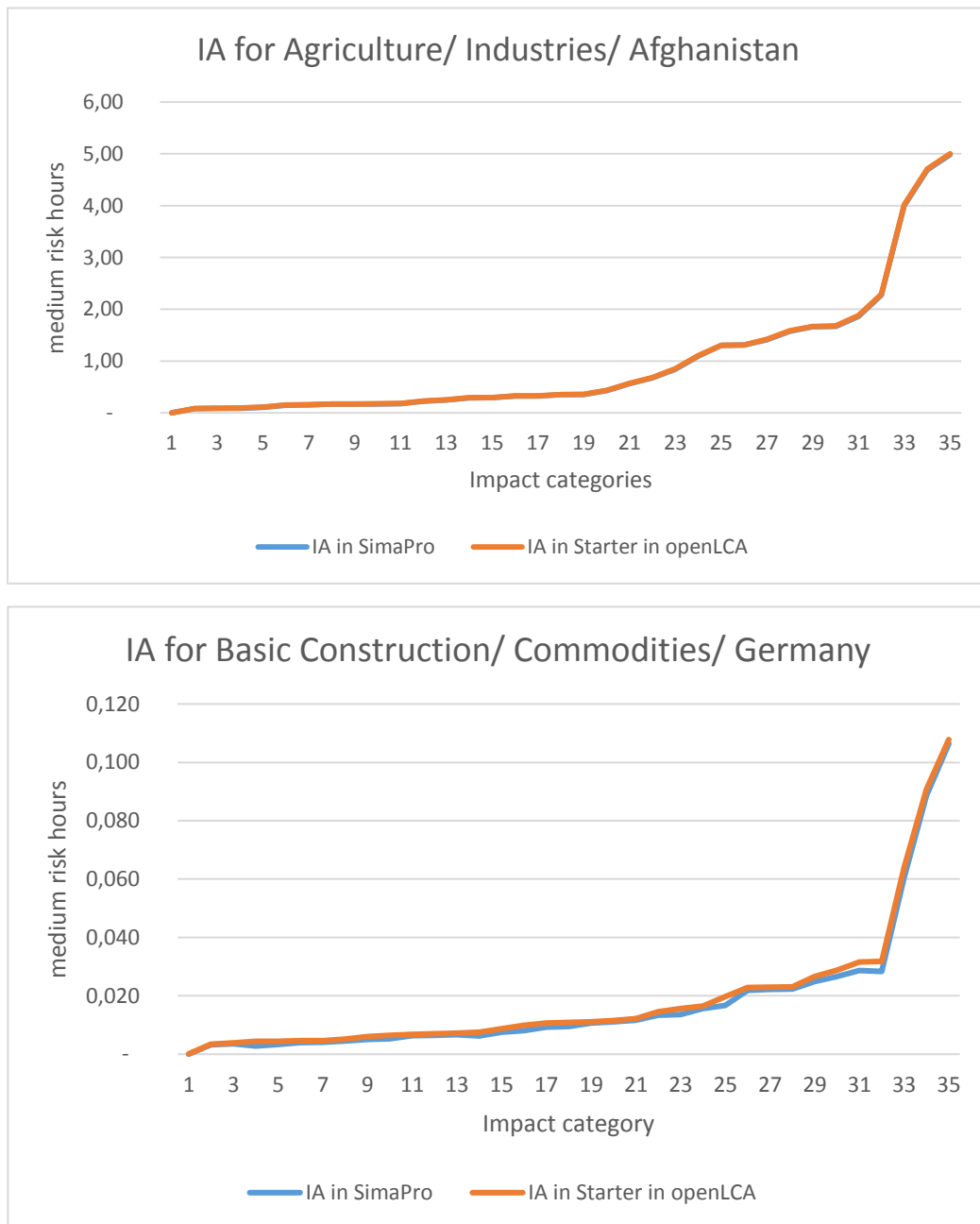


**Figure 3: Variation coefficients of inventory results of both softwares for Agriculture/ Industries/ Afghanistan (above) and Basic Construction/ Commodities/ Germany (below)**

## 4.2 Impact Assessment

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

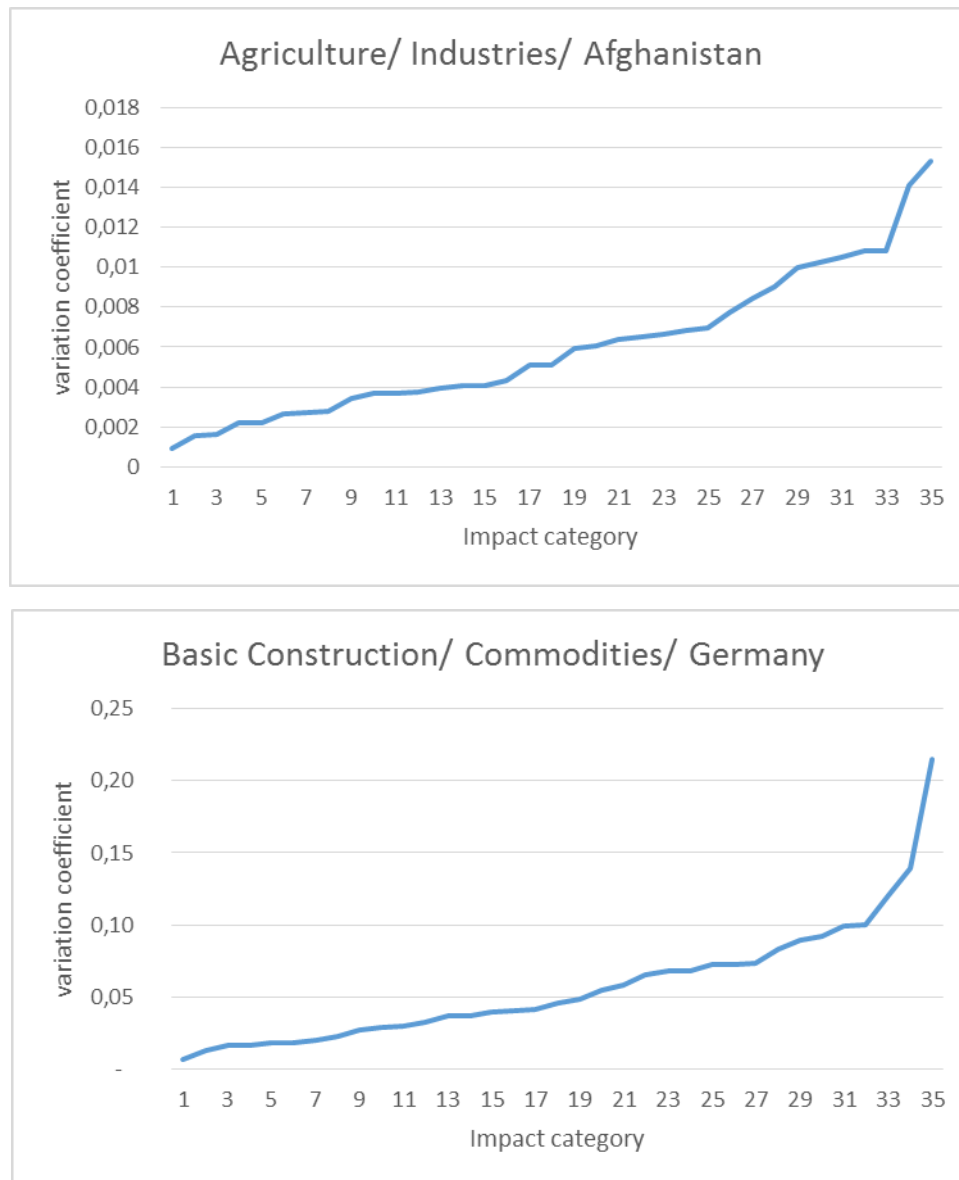
The graphs in Figure 4 illustrate that also the results of impact assessment differ only very slightly between both PSILCA versions. This refers to the absolute values as well as to the order of impact categories in each software.



**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.