# A Life Cycle Assessment of diapers

Let us assume that you are going to do an LCA about diapers. The choice of diapers may seem strange at first but this choice is guided by two observations. First, many LCA studies have been conducted on diapers and packaging, possibly because these kinds of products have been the subject of much criticism by environmentalists. Second, a diaper LCA appears at first glance to be rather straight forward, compared with a complex object like a car. Yet diaper LCAs turn out to be not so simple, as we shall see.

When conducting an LCA it is important to determine the functional unit. This is especially important when comparing similar products or similar ways to achieve the same end result. Early diaper studies, comparing reusable cloth diapers vs. disposable plastic and cellulose diapers, neglected to seriously consider the functional unit and this left them open to critique.

Is the functional unit one diaper? In this case one disposable diaper would be considered the same as one cloth diaper, regardless of how many times the cloth diaper could be reused. Clearly the selection of one diaper as the functional unit would be an unfair comparison. Is the functional unit a certain number of diaper changes? In this case perhaps 100 diaper changes could be the functional unit. 100 disposable diapers would be needed for this functional unit whereas perhaps ten cloth diapers washed ten times would correspond to the functional unit.

However this does not present the whole picture!. Babies who only use cloth diapers tend to stop using diapers as much as one half year earlier than babies who only use disposable paper diapers. This means that the functional unit is not so much diapers or the number of changes of diapers but ”one baby” that is to say the number of diapers required during the period from birth until the baby becomes able to control itself and no longer needs a diaper. The choice of functional units will sometimes disfavor the disposable diaper and sometimes disfavor the cloth diaper. It would appear that the most reasonable functional unit would be ”one baby.”

Let us move onto the system boundaries. Here we determine what constitutes the system surrounding the functional unit. Clearly the properties of the diapers will lead to different system boundaries. Cloth diapers are washed and dried which requires energy, water, and detergent (and if dried in a dryer will require heat). The choice of the detergent and the amount used per wash will have varying environmental impacts as well.

On the other hand paper diapers, while never washed, end up on the landfill and remain largely inert sometimes for decades. Additionally plastic and cellulose is used in their manufacture. The plastic comes from refined oil and the cellulose from trees.

The question is: where do we draw the limits for our system? In the case of the paper diapers do we begin with oil extraction and the cutting down of trees and cover all possible impacts up until and including disposal on a landfill? The environmental impact is thus mostly during the production and disposal. On the other hand cloth diapers have greater environmental impact when used and reused since they are washed. The impact from disposal on a landfill is presumably minimal. Worth considering is also how the cotton that goes into the diaper was grown and treated. Was the cloth bleached and by what method? How many pesticides where used during cotton cultivation? If the cotton was grown in a semi-arid region, what were the environmental effects of irrigation? The cleaner technology case study of “Green Cotton” in chapter six touches upon some of these issues.

There is no correct answer here. We hope that the reader can see that where the system boundaries are set can strongly influence results.