

Project Update: January 2020

As part of our objective of 2nd RSG project, we introduced area-enclosure conservation intervention into *Boswellia papyrifera* woodland to assess its roles for natural regeneration and seedling growth in our study Abergele district, northern Ethiopia. Inside of the enclosure, soil and water conservation structures were also introduced. The enclosure was protected and well managed for 7 consecutive months. Then, data related to *B. papyrifera* seedlings and others (Table 1) were collected and compared with those of data collected from adjacent non-enclosure (freely grazed by animals). GenStat software was used to determine statistical difference between the area enclosure and non-area enclosure on different seedling growth parameters listed in Table 1. These results were also shared with key stakeholders through training and workshops.

Our statistical analysis results showed that number of newly regenerates of *B. papyrifera* and other woody species found higher in the introduced area-enclosure than that of adjacent non-enclosure area. For example, on average, we counted 15 natural regenerations of *B. papyrifera* compared to the adjacent non-enclosure area that has only five regenerates (Table 1). The highest regeneration found in area-enclosure due to the improvements of soil moisture and nutrient status by reducing animal interferences.

Furthermore, the average *B. papyrifera* seedling height and its average collar diameter in area-enclosure were 8.5 and 5.3cm, respectively, which far better than the adjacent non-enclosure that has an average height of 5.4cm and average collar diameter of 2.5cm. The other seedlings parameters like leaf number and branch numbers were also statistically higher in area-enclosure than the adjacent non-enclosure area (Table 1). Besides, the area-enclosure provided a higher seedling biomass (on average 58 gram/seedling) compared to non-enclosure area (on average 33 gram/seedling). These seedling growth parameters are good indicators for the seedlings to grow to the next sapling stage of the species.

In conclusion, the area enclosure conservation intervention enhanced natural regeneration, survival, seedling growth and rehabilitation of *B. papyrifera* and other associated woody species through improving soil growing conditions and reducing erosion in northern Ethiopia

Table 1. *Boswellia papyrifera* seedlings responses under area enclosure and non-area enclosure conservation interventions in Abergele district, northern Ethiopia

Interventions	Number of <i>Boswellia papyrifera</i> regenerates	Number of regenerates of Other woody species	Average <i>B. papyrifera</i> Seedling height (cm)	Average <i>B. papyrifera</i> Root collar diameter (cm)	Average <i>B. papyrifera</i> Leaf number per seedling	Average <i>B. papyrifera</i> branch number per seedlings	Average <i>B. papyrifera</i> biomass per seedling (g)	Mortality of <i>B. papyrifera</i> seedlings
Enclosure	15.1a	6.2a	8.5a	5.3a	9.4a	6.2a	58.17a	1.2a
Non-enclosure	9.3b	2.2b	5.4b	2.5b	4.2b	3.4b	33.34b	4.8b
LSD (5%)	0.33	0.31	0.57	0.50	0.39	0.23	0.43	0.28
CV (%)	2.3	3.9	4.4	6.8	3.1	2.6	0.5	4.8

NB- Means with different letters show significant difference



Fig 1. The area enclosure with soil water conservation structures inside of *Boswellia papyrifera* woodland in northern Ethiopia.



Fig 2. Newly regenerates of *Boswellia papyrifera* in the area enclosure with a good coverage of grasses and herbs.



Fig 3. Data collection jointly with local community from the newly emerged seedlings of *Boswellia papyrifera*.



Fig 4. Data collection from the newly emerged seedlings of *Boswellia papyrifera*.