Supplementary material: Private-Land Control and Deforestation Dynamics in the context of implementing the Native Forest Law in the Northern Argentinian Dry Chaco

**Annex 3 (A.3):** Social actors and historical land-use changes

Inhabitants in the Chaco are culturally and ethnically diverse. Historically the social and landscape structures have been changing. The original landscape was mostly grassland with patches of forests, kept stable by periodic fire management by indigenous people (Grau et al. 2015). The Chaco’s original people are mostly nomadic with economies based on fishing, hunting and gathering. The arrival of the Europeans and the domestic cattle changed the frequency and intensity of the fires drastically, leading to the shrub encroachment of the region (Bucher and Schofield 1981; Grau et al. 2015) and, at the same time, to the displacement of indigenous communities.

The expansion of the railroads and colonization programs into the region since the 1880s allowed greater dispersal of the peasants (i.e. *campesinos* or *criollos;* local people of European and indigenous descent; Mastrangelo et al. 2019) into the forests, with the practices of extensive cattle ranching and wood extraction (Bucher and Huszar 1999). This process generated a constant transformation of the forests, with small settlements for cattle ranching including a water source, and basic infrastructure locally known as *puestos* (see Grau et al. 2008, Macchi et al. 2012). Progressive impoverishment of forests by unplanned logging and overgrazing, coupled with lack of rural employment opportunities, stimulated the migration of young people to the periphery of the cities (Bucher and Huszar 1999). The current population, still at a very low density (< 3.1 inhabitants/km2), accounts for *c*. 550 000 inhabitants (in 2010), or 68% of the total rural population (INDEC, National Census 2010, www.indec.gob.ar).

Local rural people are peasants and indigenous communities, mostly Wichí within the study area, but also other ethnic groups in different regions, such as Qom, Pilagá, Guarani and Lule-Vilela communities (INAI 2020). Both social groups, peasants and indigenous peoples, have amongst the highest poverty levels of Argentina (Longhi 2014; Krapovickas et al. 2016). Their access to natural resources was traditionally open, and goods were considered and used in practice as a common-pool resource. They have historically used firewood as the main source of energy, and bush meat as an important source of protein (Bucher and Huszar 1999; Altrichter and Basurto 2008; Krapovickas et al. 2016). Their economy is mainly based on crops for their own consumption, selective logging, hunting and gathering. While indigenous people live aggregated in communities (> 50% of the indigenous people of Argentina live within the study area; Cervera-Novo 2010), peasants are highly dispersed across the forest, and are mainly cattle breeders that practice extensive ranching (Marinaro et al. 2017).

The arrival of genetically modified soybean in the 1980s brought a new type of social actor into the region, namely large-scale producers. They came to the region with technology, capital, know-how and machinery to develop intensified agricultural activities, often renting the land (le Polain de Waroux et al. 2018). Soybean cultivation started in the early 1970s in the Pampa ecoregion, which displaced most ranching into the Espinal ecoregion and the more isolated areas of the Chaco ecoregion (Pengue 2014; Viglizzo et al. 2011; Piquer-Rodríguez et al. 2018). By the 1990s, soybean had expanded into the Chaco and Espinal regions, due to increasing soybean prices (Cáceres 2015; Leguizamón 2016) and new political and economic reforms that facilitated the increased production of crops in Argentina (Pengue 2005), including genetically modiﬁed soybean varieties (Cáceres 2015; Leguizamón 2016). These land-use changes resulted in *c*. 14% of the Argentinian Chaco being converted into agriculture by 2015 (Baumann et al. 2016).

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