Table S1. Questionnaire administered during the farm visits.

**General Information**

Farm name:
Farm manager:
Municipality:
When was this farm established?
Certified farm: ( ) RTRS ( ) ProTerra ( ) Other, please specify: \_\_\_\_\_\_\_\_\_\_\_\_
( ) Not certified
Is the entire area of this farm registered in the CAR (Rural Environmental Registry)?
Which crops are cultivated?
If animals are raised, specify category and number of animals:
Total farm area:
Non-cultivated area without native vegetation:
Cultivated area (2018/2019): Soybean:
Area with native vegetation, legal reserve, and permanent preservation areas (APP):
Area under vegetation regeneration:
Has the cultivated area of the farm decreased in the last 10 years?
Has the soybean area increased in the last 5 years?
Average yield per hectare:
Production over the last 5 years:

**If certified**

When did this farm obtain certification?
What main changes would you highlight after certification?
Which practice was commonly performed before certification and is no longer allowed?

**Soybean Production Practices**

Which soybean cultivars do you grow?
Have there been changes in the selection criteria for cultivars in the past 5 years?
( ) Yes ( ) No
If yes, what were the changes?
Current practices | Previous practices
What criteria do you consider when choosing soybean cultivars?
( ) Disease resistance
( ) Yield and stability
( ) Maturity group
( ) Grain composition
( ) Plant height and lodging resistance
Regarding crop cycle:
( ) Medium cycle ( ) Early cycle ( ) Super early ( ) Combination of different maturity groups

**Soil Preparation**

How is soil prepared?
Is soil acidity corrected? Is there soil cover? Is no-tillage practiced?
Have there been changes in soil preparation in the last 5 years?
How is fertilization carried out? Have fertilization practices changed in the last 5 years?
Is phosphorus, potassium, and micronutrient correction applied? Are nutrient balances considered?
Do you practice crop rotation? If yes, which crops and for how long?
Are organic matter balances considered when planning crop rotation?
Is soil scarification or subsoiling performed? At what intervals?

**Sowing and Crop Management**

Has the sowing period changed in the past 5 years?
Are production systems designed to minimize pest and disease impacts?
(e.g., intercropping, crop rotation, fallow periods, sanitary void)
Has the incidence or severity of diseases changed in recent years?
( ) Yes ( ) No
If yes, how did it change? Have new diseases emerged?
Did severity increase for any specific disease? ( ) Yes ( ) No
Or was there a decrease in disease incidence and severity?
If incidence decreased, what factors might be related to this change?
( ) Improved management
( ) Preventive use of crop protection products
( ) Weed management
( ) Unknown

Do you keep a record of pest and disease history in soybean areas?
Which pests and diseases were most frequent in the last 5 years?
Are pests, diseases, and weeds properly identified before applying crop protection products?
( ) Yes ( ) No
Have all crop protection products maintained their effectiveness in recent years?
( ) Yes, all ( ) Some ( ) None
Have all GMOs maintained their specific traits (e.g., pest resistance)?
( ) Yes, all ( ) Some ( ) None
Is there mechanical weed control? How is weed management done—pre- or post-sowing? Which products are used?
Do you use or have you used IPM (Integrated Pest Management)?
Are crop protection products applied preventively or only when pests or diseases are identified?
What criteria do you use to choose crop protection products?

**Harvest**

Is desiccation applied before harvesting soybeans?
( ) Yes ( ) No
If yes, which product is used?
Were there any changes in the last 5 years? If certified, did this change after certification?

### ****General Aspects****

#### **Water**

**Are the agricultural areas irrigated?
Which irrigation system is used (on how many hectares)? How are irrigation needs determined?
Is there a septic system or other waste treatment system on the farm?
Is there a system for storing or collecting oils and greases?
Has water availability worsened in the last 5 years? Has water quality declined in the last 5 years?
Has well depth been increased, the irrigation pump lowered, or the type of pump changed?
Are there or were there conflicts with other water users regarding water quantity or quality?
Is water consumption monitored, and are changes tracked?**

**Biodiversity**

How many hectares could legally be converted to farmland, and how many were actually converted?
Has any portion of the forested area on the farm been cleared in the last 10 years?
How much of the forested area was planted or naturally regenerated over the last 10 years?
Did the certifying body request or provide assistance for biodiversity identification?
Was a biodiversity study conducted to obtain certification?
Was a biodiversity management plan implemented to promote species and habitats, including planning, implementation, and monitoring of measures?
(e.g., ecological corridors, APP restoration and regeneration)

**Crop Protection Products**

Is there detailed control over the use of crop protection products?
Are weather conditions observed before application?
Are aerial applications carried out?
Are minimum buffer distances from houses and roads respected during application? What are these distances (including rivers, springs, forests, etc.)?
Have any issues related to pesticide drift been observed?
Do workers use personal protective equipment (PPE) during application?
What are the storage conditions for crop protection products?

**Waste Management**

Is the farm's recycling potential fully utilized (i.e., all recyclable materials are recycled)?
Is there a waste management plan?
Is organic material composted?

**Energy**

Is energy use monitored (consumption, changes over the years)?
Are different tools used for energy generation on the farm (e.g., solar panels)?
Is fuel use (diesel, gasoline, etc.) monitored by machine hours (planter, sprayer, harvester, etc.)?

### ****Labor****

**Working hours per day:**

**Working days per week:**

**Vacation days per year:**

**Compensation (per person/year; net salary + meals + housing + other benefits): average, highest, and lowest wages:
Do all workers have a written employment contract and are they officially registered?
Do all workers receive pay slips?
How many accidents or occupational illnesses have been reported in the last 5 years?
Is there an Occupational Health and Safety Risk Management Program in place for workers?
Are workers trained in the handling and storage of crop protection products?
Are employees responsible for applying toxic substances (e.g., pesticides) equipped with proper PPE?**

### ****Financial Analysis (Soybean)****

#### **Costs**

**Direct production costs (in bags per hectare):
Maintenance costs for buildings and machinery (average):
Land lease:
Certification costs. Are there additional costs for meeting certification standards?**

### ****Farm Management****

**Is the soybean crop insured?
Have there been conflicts over land use or ownership in the last 5 years involving local or Indigenous communities?
If so, how were the conflicts resolved?**

### ****Information****

**How do you obtain information about soybean production (cultivars, crop protection, prices, innovations, etc.)?
Does certification provide you with information about soybean production? (Only for certified farms)
Are you satisfied with the information you receive about soybean production?
How do you think you could benefit from producing certified soybeans?**

Table S2. List of chemical substances, target classes, and chemical classes of the crop protection products mentioned in the interviews with the managers of the visited farms

|  |  |  |
| --- | --- | --- |
| Substance | Pesticide Target Class | Pesticide Chemical Class |
|  Tiametoxam  | Insecticide | Neonicotinoid |
| 2,4-d  | Herbicide | Alkylchlorophenoxy |
| Acefato | Insecticide | Organophosphate |
| Acetamiprid | Insecticide | Neonicotinoid |
| Alpha-cypermethrin | Insecticide | Pyrethroid |
| Aluminium silicate | Insecticide | Inorganic compound |
| Azoxistrobina  | Fungicide | Strobilurin |
| Bacillus thuringiensis | Insecticide | Micro-organism derived |
| Bentazona  | Herbicide | Benzothiazinone |
| Benzoato de emamectina | Insecticide | Micro-organism derived |
| Benzovindiflupir | Fungicide | Amide |
| Beta-cyfluthrin | Insecticide | Pyrethroid |
| Bifentrina | Insecticide | Pyrethroid |
| Carbendazim | Fungicide | Imidazole |
| Carboxina | Fungicide | Oxathiin |
| Carfentrazone-ethyl | Herbicide | Triazolone |
| Ciantraniliprole  | Insecticide | Diamide |
| Cipermetrina | Insecticide | Pyrethroid |
| Ciproconazol | Fungicide | Triazole |
| Cletodim | Herbicide | Cyclohexanedione |
| Clomazona | Herbicide | Isoxazolidinone |
| Cloransulam-methyl | Herbicide | Sulfonanilide |
| Clorantraniliprole | Insecticide | Anthranilic diamide |
| Clorimurom-etílico | Herbicide | Sulfonylurea |
| Clorotalonil | Fungicide | Chloronitrile |
| Clotianidina | Insecticide | Neonicotinoid |
| Diafenthiuron | Insecticide | Thiourea |
| Dibrometo de diquate  | Herbicide | Bipyridylium |
| Dicloreto de paraquate | Herbicide | Quarternary ammonium compound |
| Diclosulam | Herbicide | Sulfonanilide |
| Difenoconazol | Fungicide | Triazole |
| Diflubenzurom | Insecticide | Benzoylurea |
| Diuron | Herbicide | Phenylamide |
| Epoxiconazol  | Fungicide | Triazole |
| Fenoxaprop-p-ethyl | Herbicide | Aryloxyphenoxypropionate |
| Fenpropatrina | Insecticide | Pyrethroid |
| Fipronil | Insecticide | Phenylpyrazole |
| Fluazifop-p-butilico | Herbicide | Aryloxyphenoxypropionate |
| Fluazinam | Fungicide | Phenylpyridinamine |
| Flubendiamid | Insecticide | Benzene-dicarboxamide |
| Fludioxonil | Fungicide | Phenylpyrrole |
| Flumetsulam | Herbicide | Cyclodiene |
| Flumioxazina | Herbicide | N-phenylphtalamides |
| Flutriafol | Fungicide | Triazole |
| Fluxapiroxade | Fungicide | Pyrazolium |
| Fomesafem | Herbicide | Organochlorine |
| Gamma-cyhalothrin | Insecticide | Pyrethroid |
| Glifosato | Herbicide | Phosphonoglycine |
| Glufosinato - sal de amônio | Herbicide | Phosphinic acid |
| Haloxifope-p-metílico  | Herbicide | Aryloxyphenoxypropionate |
| Imazetapir | Herbicide | Imidazolinone |
| Imidacloprido | Insecticide | Neonicotinoid |
| Indoxacarb | Insecticide | Oxadiazine |
| Lactofen | Herbicide | Diphenyl ether |
| Lambda-cialotrina | Insecticide | Pyrethroid |
| Lufenuron  | Insecticide | Benzoylurea |
| Mancozebe | Fungicide | Dithiocarbamate |
| Metomil | Insecticide | Carbamate |
| Metoxifenozida | Insecticide | Diacylhydrazine |
| Novaluron | Insecticide | Benzoylurea |
| Paraquat | Herbicide | Bipyridylium |
| Permetrina | Insecticide | Pyrethroid |
| Picoxistrobin | Fungicide | Strobilurin |
| Piraclostrobina | Fungicide | Strobilurin |
| Piriproxifem | Insecticide | Unclassified |
| Profenophos | Insecticide | Organophosphate |
| Propanil | Herbicide | Anilide |
| Propiconazol | Fungicide | Triazole |
| Protioconazol | Fungicide | Triazolinthione |
| Quizalofop-p-ethyl | Herbicide | Aryloxyphenoxypropionate |
| Saflufenacil  | Herbicide | Amide |
| S-metolaclor | Herbicide | Chloroacetamide |
| Spinetoram | Insecticide | Spinosym |
| Sulfentrazona  | Herbicide | Aryl triazolinone |
| Tebuconazol | Fungicide | Triazole |
| Teflubenzurom | Insecticide | Benzoylurea |
| Tiodicarbe | Insecticide | Carbamate |
| Tiofanato-metilico | Fungicide | Imidazole |
| Tiram | Fungicide | Dithiocarbamate |
| Triclopir-butotílico | Herbicide | Pyridine compound |
| Trifloxistrobina  | Fungicide | Strobilurin |
| Triflumurom | Insecticide | Benzoylurea |
| Zeta-cypermethrin | Insecticide | Pyrethroid |