



**HAL**  
open science

## **Covid-19 management by farmers and policymakers in Burkina Faso, Colombia and France: lessons for climate action**

Nadine Andrieu, Laure Hossard, Nina Graveline, Patrick Dugue, P. Guerra, N. Chirinda

### ► To cite this version:

Nadine Andrieu, Laure Hossard, Nina Graveline, Patrick Dugue, P. Guerra, et al.. Covid-19 management by farmers and policymakers in Burkina Faso, Colombia and France: lessons for climate action. *Agricultural Systems*, 2021, 190, pp.1-6. 10.1016/j.agsy.2021.103092 . hal-03141260

**HAL Id: hal-03141260**

**<https://hal.inrae.fr/hal-03141260>**

Submitted on 13 Feb 2023

**HAL** is a multi-disciplinary open access archive for the deposit and dissemination of scientific research documents, whether they are published or not. The documents may come from teaching and research institutions in France or abroad, or from public or private research centers.

L'archive ouverte pluridisciplinaire **HAL**, est destinée au dépôt et à la diffusion de documents scientifiques de niveau recherche, publiés ou non, émanant des établissements d'enseignement et de recherche français ou étrangers, des laboratoires publics ou privés.



Distributed under a Creative Commons Attribution - NonCommercial 4.0 International License

# 1 Covid-19 management by farmers and policymakers in Burkina Faso, Colombia and 2 France: lessons for Climate Action

---

3  
4 Andrieu N.<sup>1,2,3</sup>, Hossard L.<sup>4</sup>, Graveline N.<sup>4</sup>, Dugue P.<sup>1,3</sup>, Guerra P.<sup>1,3</sup>, Chirinda N<sup>5</sup>

5  
6 1 French Agricultural Research Centre for International Development (CIRAD), UMR  
7 Innovation, F-34398 Montpellier, France

8 2 International Center for Tropical Agriculture (CIAT), Km 17 Recta Cali-Palmira, Apartado  
9 Aéreo 6713, Cali, Colombia

10 3 Univ. Montpellier, Montpellier, France

11 4 UMR951 Innovation, INRAE, Univ Montpellier, F-34060 Montpellier, France

12 5 Mohammed VI Polytechnic University (UM6P), AgroBioSciences (AgBS), Agricultural  
13 Innovations and Technology Transfer Centre (AITTC), Benguerir, Morocco

14  
15

## 16 1. Introduction

17 All over the world, the lockdown approach, which was used as the primary strategy to  
18 mitigate the Covid-19 crisis, affected various productive sectors and resulted in increased  
19 poverty (UNO Info, 2020). The agricultural sector was recognized as a priority sector and was  
20 less affected by Covid-19 related travel restrictions for food security reasons. However, early  
21 policy responses, which varied in type and number, also affected agricultural products' supply  
22 and demand (Gruère and Brooks, 2020). Anecdotal evidence suggests that the Covid-19 crisis  
23 had short-term positive impacts on natural ecosystem regeneration and greenhouse gas  
24 emissions (GHG) reduction because the lockdowns slowed down exchanges and economies.  
25 Indeed, the annual estimate in GHG reductions for 2020 suggests a decrease of between 4 to  
26 7% (Le Quéré et al., 2020). Other estimates suggest that, given the slowdown of the economy  
27 and the correlation between GHG and Net Domestic Product, GHG emissions may even  
28 decrease by 10% in 2020 (Carbon Brief, 2020).

29

30 While policy aimed at guiding climate action is currently generally ineffective in stimulating  
31 the needed changes (Howlett, 2014), the Covid-19 crisis fostered quicker and massive policy  
32 decisions and actions. The complicated relationship between ingrained individual actions and  
33 climatic impacts that are cumulative and neither immediate nor equally distributed across the  
34 world could explain the slow and ineffective climate action (Galbraith and Otto, 2020).

35 However, given that climate change is a severe challenge facing our societies and agricultural  
36 systems (IPCC, 2018), analyzing the impacts that Covid-19 had on agricultural systems and  
37 the decision taken by policymakers to handle its direct and indirect effects can help society  
38 draw lessons on how to improve climate action. It also appears of utmost importance to  
39 consider whether the enacted recovery measures and plans are coherent with climate action  
40 (Hammer and Hallegatte, 2020).

41  
42 In this paper, we describe the decisions taken by farmers and policymakers in Burkina Faso,  
43 Colombia, and France, to mitigate the adverse effects of Covid-19 on the agricultural sector.  
44 Inspired by the literature on climate-proofing that aims to assess the coherence of investments  
45 in climate change mitigation and adaptation actions, we explored the impacts of the Covid-19  
46 response on GHG emissions from the agricultural sector.

47

## 48 **2. Materials and methods**

49

### 50 *2.1. Surveys*

51 In Burkina Faso, Colombia, and France (Figure 1) surveys were carried out with actors from  
52 the agricultural sector, during the first lockdowns conducted in the three countries (Table 1).  
53 We enquired about the negative and positive impacts of the health crisis on their activities and  
54 strategies adopted to manage initial impacts. The collected primary data were triangulated  
55 with information collected in regional or national media, and reports from the respective  
56 countries States, different united nations agencies, non-governmental organizations, and  
57 professional organizations in agriculture.

58

59 In Burkina-Faso, surveys were conducted during April and May in the sub-humid region  
60 (n=81). Three types of value chains were investigated: market gardening, livestock, and  
61 rainfed crops (cereal and cotton). We interviewed 21 technical advisers from government  
62 ministries and the Cotton Company, 27 farmers, 12 leaders of farmer groups and 21 traders  
63 (Table 2).

64

65 In Colombia, 25 surveys were conducted in August. Of these surveys, 20 were conducted with  
66 coffee farmers located in the Cauca region of Colombia. We also surveyed five peri-urban  
67 farmers producing organic vegetables and located near the third-largest city in the country,  
68 Cali.

69

70 In France, analysis of media data was complemented by surveys conducted in the southern  
71 part (NUTS-3 Hérault, belonging to NUTS-2; Occitanie), with four vine-growers and four  
72 cooperatives in May and June. Vine cultivation for wine production is the most extensive  
73 land-use in Hérault, with 46.5 % of the arable land (Chambres D'Agriculture Occitanie,  
74 2017). Nationally, vine cultivation uses 3% of the arable land and is responsible for 15% of  
75 agricultural production value (CNIV, 2020).

76

## 77 *2.2. Assessment of Covid-19 management decision on GHG emissions*

78 During crises, adaptation or recovery measures or plans at local or national scales may not  
79 necessarily address longer-term or structural problems. The concept of *building back better*  
80 stemming from the natural hazard management literature aims to link the post-disaster  
81 reconstruction with longer-term disaster mitigation and vulnerability reduction (Kennedy et  
82 al., 2008). Checking the emergency plans' coherence is needed to avoid unintended  
83 consequences such as harmful subsidies leading to inequitable actions. Thus, we assessed the  
84 GHG emissions impacts of farmers and policymakers' decisions and actions in response to the  
85 covid-19 crisis.

86

87 We used the Cool Farm Tool (version 2.0 Beta 3) to estimate changes in GHG emissions  
88 associated with the Covid-19 response. The Cool Farm Tool is a greenhouse gas calculator  
89 that has the advantage of considering the farm sources and sinks of GHG emissions, including  
90 post-harvest processes and transportation (Hillier 2012). Moreover, the Cool Farm Tool  
91 represents an accessible approach to estimate GHG impacts from agriculture (Richards et al.  
92 2016). Specifically, using the Cool Farm Tool, we estimated GHG emissions related to  
93 changes that occurred along the value chains of three main cash crops: cotton in Burkina  
94 Faso, coffee in Colombia and grapes in France (section 3 and Table 3).

95

## 96 **3. Results and Discussion**

97

### 98 *3.1 Short and medium-term effects of Covid-19 on the agricultural sector at the farm level*

#### 99 *3.1.1. Covid-19 effects on case study farms in Burkina Faso*

100 In Burkina Faso, the lockdown was applied in urban areas affected by Covid-19, in March  
101 2020. Consequently, surveyed crop farmers and pastoral farmers in rural areas were not  
102 affected in their productive activities. However, they mentioned that products' marketing was

103 affected as the demand from traders decreased between 20 March and 4 May. The surveyed  
104 traders indicated that local markets were able to recover following the adoption of social  
105 distancing measures. In contrast, the technical advisers and the representatives of farmer  
106 organizations mentioned that export markets for food and cotton in neighbouring countries,  
107 Europe and Asia were all disrupted for extended periods (CILLS, 2020; Edmonds et al., 2020;  
108 Dugué et al., 2021). For example, the market gardening industry was negatively affected by  
109 transport difficulties to Côte d'Ivoire and Ghana; two countries that import large quantities of  
110 potato, onion, tomato, pepper, and chilli from Burkina Faso. Market gardeners in the two  
111 surveyed areas, consequently, had to deal with a significant drop in the selling price of  
112 perishable vegetables such as tomatoes, cabbage, chilli peppers and peppers, which  
113 correspondingly decreased by 60%, 70%, 62%, and 80% compared to average prices from  
114 January to February, before the start of the pandemic. Farmers that employ temporary labour  
115 mentioned that due to high labour costs, harvesting costs were higher than the expected  
116 returns and they thus preferred to abandon the plots before harvests. To our knowledge, there  
117 was no innovation or approach adopted at the farmer or trader levels to overcome the high  
118 labour cost challenge.

119

### 120 *3.1.2. Covid-19 effects on case study farms in Colombia*

121 In Colombia, the initial on-farm effects of Covid-19 resulted in the reorganization of labour.  
122 The surveyed organic vegetable producers near Cali increased their production to respond to a  
123 higher demand for quality and healthy products on the market and their own families as  
124 children were continuously at home. They consequently had to reorganize their farm activities  
125 and labour to meet the increased demand and workload. In these communities, women and  
126 youth generally assume large proportions of home chores (OEA, 2020). Increased labour  
127 demands generally negatively affected women and youth, as they took on new farm duties.  
128 More drudgery was added to the work as they also had to comply with stricter sanitary  
129 measures in the processing and delivery of food products to consumers.

130

131 Surveyed coffee farmers also reported a reorganization of farm activities. This reorganization  
132 was linked to decreased contacts with the city (for off-farm activities or leisure) and more  
133 time available to farm activities. However, workers' mobility during the first trimester  
134 affected coffee harvesting (Forbes, 2020). Consequently, despite the selling price of the coffee  
135 being exceptionally high, a 7% decrease in coffee production was reported (AsoExport,  
136 2020).

137

138 *3.1.3. Covid-19 effects on case study farms in France*

139 In France, the initial impacts on vine growers appeared before the lockdown as there were  
140 turbulences on international wine markets. Surveyed wine merchant indicated that wine  
141 exports to Asia declined in February linked to a substantial decrease in Chinese and Japanese  
142 demand. During the lockdown, contrasting effects were observed across the agricultural  
143 sectors. In the short-term, there were no visible impacts of the pandemic on labour demand,  
144 cereal stocks or marketing, except for cereals grown for fuel (Omnes, 2020). In contrast,  
145 produce sales in two specific agricultural sub-sectors decreased, i.e., vegetable production in  
146 the short-term (Lang, 2020) and vineyards in the medium-term. The two main issues with  
147 vegetable production included: (1) difficulty finding farm labour; (2) difficulty selling due to  
148 logistical perturbations.

149

150 Regarding labour, the government platform, set-up to connect farmers and people who  
151 became temporarily unemployed due to the crisis was mostly unused (Zapalski, 2020). Some  
152 farmers were consequently unable to harvest their crops due to labour shortages. The  
153 difficulties in selling products resulted in increased demand for direct selling platforms,  
154 although without (for now) systemic changes in cropping practices.

155

156 For the vineyard sector, the significant impact was a decrease in sales, which strongly depend  
157 on the type of wine and the distribution channel, i.e., their labels and thus on the type of  
158 buyers (pers. comm, head of a wine cooperative). For instance, fine wine like Champaign's  
159 and premium wines were most affected because their marketplaces were closed (i.e.,  
160 restaurants, bars, hotels, conferences, celebrations), resulting in an 80% decrease in sales in  
161 March and April (Vitisphere, 2020) and a yearly decrease of 20-30% (larvf.com, 2020).  
162 Independent wine producers selling directly to clients or restaurants and hotels were  
163 negatively affected as the tourism sector ground to a halt during the lockdown and was slow  
164 to recover in the aftermath. Conversely, labels sold to mass retail outlets were less affected.  
165 There have been limited partial deferral from bars, hotels and restaurants markets to mass  
166 retail and wine shops with an advantage for Bag-In-Box. Exports were reduced by 12% in the  
167 first trimester of 2020 (Béteille, 2020). The decrease in sales led to bad financial  
168 performances for vine-growers and wine companies. In the medium-term, wine demand will  
169 also be strongly affected by the economic slowdown and the decrease in consumer incomes  
170 (Cardebat et al., 2020). The drastic reductions in demand led to increased wine stocks in all

171 wine regions (+6/7% stocks for the 2019/2020 campaign compared to 2018/2019). The  
172 increased wine stocks caused a problem at the cellar level as storage space was limited. Due  
173 to saturation in wine markets and a decrease in wine prices, some farmers responded by  
174 developing innovative distribution channels (platforms or private delivery).

175

176 To manage wine stocks, contrasting strategies were adopted by grape growers and wine  
177 sellers (Girard, 2020): while buyers aim to reduce their stocks, growers support high yield  
178 levels to maintain their production level and ensure economic sustainability (holding prices  
179 constant).

180 Although the crisis did not impact agronomic and winemaking practices *per se*, it led to either  
181 a voluntary decrease in grape yields or label changes. Merchants aimed at reducing wine  
182 stocks and thus promoted a reduction in wine production to stabilize the market and avoid  
183 price collapses. On the other hand, vine-growers and wine processors aimed at maximizing  
184 wine production at a given price. Merchants and growers of the various Bordeaux protected  
185 denominations of origin (PDO) aimed at reducing the 2020 wine production by 10% while  
186 actors of Cognac PDO decreased production objectives in 2020 by about 9.5%<sup>1</sup>. The head of a  
187 wine cooperative explained that at an individual level, the possibility of rapidly changing  
188 wine markets from PDO to geographical identification (GI) or non-GI enables increased wine  
189 yields (PDO wines yields are limited, e.g., around 40 hl/ha in Languedoc while wines  
190 protected by a geographical identification can produce up to 90 hl/ha, yet the latter have lower  
191 sale prices).

192

193 *3.2 Short and medium-term effects of Covid-19 on the agricultural sector at the policy level*

194

195 *3.2.1. Policy responses in the Burkinabe case study*

196 The agricultural sector did not receive much support from the government compared to the  
197 industrial and touristic sectors or formal enterprises located in urban areas (Kobiane et al.,  
198 2020). The general lack of initial support was because farm households were assumed to feed  
199 themselves using their farm products. Moreover, as family farms mostly operate without  
200 permanent employees and do not pay taxes or social contributions, they were not a national  
201 response priority. However, in May 2020, the government provided a 30 billion CFA francs  
202 fund to purchase agricultural and livestock inputs to support farmers during the 2020/21

---

<sup>1</sup> Source : De la vigne au vin - Le champagne a besoin d'aides - Covid-19, Politique, Viticulture, Économie et gestion (agri-mutuel.com)

203 agricultural season (Chambre Nationale d'Agriculture, 2020; FAO, 2020). Nevertheless, as  
204 late as November 2020, it was not clear whether the resources had been disbursed.

205

206 The food trade sector was supported from the beginning of the health crisis by the creation of  
207 a 5 billion CFA francs social fund for retail fruit and vegetable traders in the city and  
208 surveyed actors mentioned that travel passes were issued to transporters of fruits and  
209 vegetables and livestock exporters to Côte d'Ivoire, Ghana and Togo. Also, they mentioned  
210 that local authorities had organized sites selling fresh products along roads and outside closed  
211 markets so that retail traders could sell their products to city dwellers in compliance with  
212 social distancing measures.

213

214 The cotton sector has been negatively affected by a decline in prices on the international  
215 market. Prices dropped from 60-72 cents/lb between October 2019 and March 2020 to 48–54  
216 cents/lb in April (-23%) then 54-58 cents/lb in May and June (LesEchosInvestir, 2020). This  
217 decrease was linked to the near-shutdown of textile factories in Asia from January until June.  
218 The shortfall for the country's leading cotton company, Sofitex, was estimated at 7 billion  
219 CFA francs (Trésor Direction Générale, 2020). Since then, the price of cotton has ranged  
220 between 60 and 65 cents/lb.

221

222 In response to this anticipated decline, the government introduced 15.4 billion CFA francs  
223 subsidies aimed at facilitating the purchase of cotton inputs (mineral fertilizers, insecticides,  
224 herbicides) and a special subsidy of about 12 billion CFA francs to support the purchase price  
225 of cotton offered to producers at the end of the 2020/21 season (Commodafrica, 2020).

226

### 227 *3.2.2. Policy responses in the Colombian case study*

228 In Colombia, the government was quick to support the agricultural sector. In particular,  
229 during the lockdown that started in late March, farmers and workers in the agro-industry were  
230 given passes to facilitate their movement and continuation of production and trading  
231 activities. In late March, the government launched a 1.5 billion-Peso credit scheme,  
232 "Colombia Agro Produce," to mainly support farmers' input purchase (Finagro, 2020). A  
233 preferential interest rate was offered to smallholder farmers (3.5%) compared to medium- and  
234 large-scale producers (4.5%) through this scheme. The resources availed by the government  
235 were initially intended for all farmers, irrespective of the size of their farm. However, the  
236 Ministry of Agriculture's statistics showed that, in the initial stages of the crisis, the aid

237 money was used by agribusiness and medium-sized farmers and not by smallholders (Finagro,  
238 2020). Thought it is important to note that smallholders already benefit little from credit even  
239 during normal circumstances. By May, a mere 20% of the available "Colombia Agro  
240 Produce" funding had been requested. Surveyed farmers reported that they had not received  
241 support from technical staff or information from banks on how to access government support.  
242 The comptroller general (a Colombian independent government institution that acts as the  
243 highest form of fiscal control in the country) raised awareness on this, leading to the  
244 subsequent exclusion of large-scale farmers from the scheme (Forbes, 2020). The government  
245 also abolished customs duty on maize, sorghum, and soybean seeds to decrease farmers' cost  
246 and compensate for the increase in prices of imported agricultural inputs (Gruère and Brooks,  
247 2020).  
248 The two main policy actions, namely the decrease in customs duty and Colombia Agro  
249 Produce scheme, highlight that the likely beneficiaries would have been large-scale farmers as  
250 they are the primary users of external inputs.

251

### 252 *3.2.3. Policy responses in the French case study*

253 The public policy response to face the health crisis included two types of instruments. The  
254 first one included various direct financial support to farms and companies. This support was  
255 open to all sectors and included: contributions deferral or waivers<sup>2</sup>, state-guaranteed loans and  
256 100% financial coverage of the partial activity allowance<sup>3</sup> (less used because production was  
257 not affected). The second type were economic instruments aimed at alleviating the market  
258 from large stocks of products such as wines. These economic instruments included a subsidy  
259 for the wine sector to distillate wine into pure alcohol and a subsidy to incentivize private  
260 storage to remove wine from the market and reduce storage cost for winemakers between €7  
261 and 9/hl for six or eight-month storage periods (FranceAgriMer, 2020). In our study site,  
262 subsidies enacted to promote wine selling. The national and regional governments created a  
263 support fund for small businesses, potentially allowing farmers to receive €1,500 from the  
264 state and €5,000 from the region<sup>4</sup>. However, conditions set to qualify for receiving these

---

<sup>2</sup> Waivers are conditioned upon a loss of revenue of more than 80% ; <https://www.economie.gouv.fr/covid19-soutien-entreprises/mesures-soutien-secteurs-restauration-tourisme-culture-sport> [accessed 5 August 2020]

<sup>3</sup> This aimed to limit the long-term cost for state and companies of reducing their labour force and rehiring people after the crisis.

<sup>4</sup> The aid of 1,500 euros is intended for companies that suffered a loss of more than 50% of turnover between March 2019 and March 2020. The aid of 2000-5000€ is intended for companies with at least one employee, or a declared spouse-collaborator. It is only for companies encountering great difficulties, their available assets not allowing them to settle their debts within 30 days or their fixed charges. They are eligible only if they have

265 subsidies were not met by all farmers, leading to potential inequalities amongst them.  
266 However, these conditions do not exclude any agricultural practices, and there is no mention  
267 of the need to decrease mineral fertilizers or pesticide use, as was the case before Covid-19,  
268 under the “Ecophyto” national plan that aimed to reduce pesticide use.

269

### 270 *3.3 Effects of Covid-19 adaptation measures on GHG emissions*

271

#### 272 *3.3.1 GHG emissions in the Burkinabe case study*

273 The measures taken by the state to facilitate the acquisition of imported inputs (mineral  
274 fertilizer, soybeans for livestock) made it possible to maintain their use in 2020. According to  
275 surveyed farmers, there was no significant change in the amounts of inputs used at the farm  
276 level. Likewise, no significant change in agricultural practices was mentioned. Most  
277 smallholder agricultural fields in Burkina Faso are characterized by low fertile soils that  
278 depend on short-term nutrient supply through mineral and organic fertilizers to support crop  
279 production (Diarisso et al., 2016). The "organic" farms remain largely secretive and  
280 uncertified. In the short-term, actors in the agricultural sector have tried to continue producing  
281 as before, but this health crisis has raised awareness among the citizenry and decision-makers  
282 on the need to limit the country's dependence on imported agricultural inputs and products  
283 (i.e., rice, milk and oil) (Kobiane and al., 2020).

284

285 A fundamental observed change was a reduction in the area under cotton production by 22  
286 000 hectares, during the 2020/2021 crop season, compared to 2019/2020 crop season (PR-  
287 PICA, 2020). This difference was caused by a drop in the cotton's purchase prices following  
288 the pandemic. This reduction in cotton area corresponded to a significant drop in fertilizer use  
289 and a decrease in cotton exports (Table 3). Consequently, we estimated the reduction in  
290 fertilizer use and cotton exports to have resulted in an absolute GHG emission reduction of  
291 29,194 tonnes of CO<sub>2</sub> eq. Moreover, where the land that was previously under cotton, was put  
292 under crops that do not receive (i.e., legumes) or receive (sorghum and maize) lower amount  
293 of fertilizer compared to cotton, land-based GHG emissions would have been low.  
294 Additionally, reduced intra-country and international trade of other agricultural products (i.e.,

---

been refused a 'reasonable' cash loan by their bank. Source: <https://chambres-agriculture.fr/exploitation-agricole/gerer-son-entreprise-agricole/coronavirus/> [accessed 10 September 2020]

295 fruits, vegetables and livestock) probably resulted in short-term decreases in transport-related  
296 GHG emissions.

297

### 298 *3.4 GHG emissions in the Colombian case study*

299 The measures taken to decrease the custom duty for agricultural inputs helped maintain input  
300 use at pre-Covid levels. For on-farm productive activities, no significant changes were  
301 mentioned by farmers or found in the available statistics. Nevertheless, we estimated that the  
302 general decrease in coffee exports (Table 3), linked to a reduction in international trade,  
303 corresponds to a decrease in transport-related GHG emissions of 4,862 tonnes of CO<sub>2</sub> eq.

304 While we did not observe a change in fertilizer use, the observed increase in the demand for  
305 organic products may, in the medium to long-term, translate to a decrease in soil-based GHG  
306 emissions than those associated with mineral fertilizer-based crop production systems  
307 (Chirinda et al., 2010).

308

### 309 *3.5 CO<sub>2</sub> emissions in the French case study*

310 For on-farm activities, neither the short-term actions mentioned by farmers nor the economic  
311 measures led to radical changes in agricultural production systems. The decrease in wine  
312 exports (Table 3) led to a decrease in transport emissions of 14 t of CO<sub>2</sub> eq. The mentioned  
313 changes in wine labelling strategies may have led to higher production levels in 2020, and  
314 more GHG for their harvest, transportation and transformation (information from personal  
315 communication with the head of a wine cooperative). No quantification of GHG emissions  
316 associated with the wine labelling changes was done with the available limited data

317

## 318 **4 Conclusions**

319 Our observations and results suggest that the measures implemented following the Covid-19  
320 crisis at the farm or policy level did not lead to a drastic change in current agricultural or  
321 farming systems. At both farm and policy level, actors of the various agricultural value chains  
322 attempted to maintain existing practices. Our initial observations showed short-term changes  
323 in the supply and demand of agricultural products. Despite the lack of proactive measures to  
324 link climate change and Covid-19 crisis (no environmental conditionality to access to the  
325 various subsidies), we estimated a net decrease of CO<sub>2</sub> emissions linked to a decrease in crop  
326 exports in the three countries.

327 While detailed assessments of the evolution of practices, labels, exports, and product-specific  
328 demands (organic, local, fresh), will be published in the 2021 statistics, from this initial  
329 evaluation, it appears the Covid-19 crisis could have been a missed opportunity to make  
330 fundamental and long-term changes and accelerate the transition to more sustainable and  
331 resilient agricultural systems. The absence of environmental conditionality raises questions on  
332 the capacity to address long-term issues such as climate change. Nevertheless, the Covid-19  
333 crisis has increased awareness of increased interdependence and global linkages. Action  
334 demands from informed citizens that may lead decision-makers to include long-term  
335 environmental thinking in future policy responses.

336

### 337 **Acknowledgements**

338 This work was funded by the ANR program (Contract #CE03), CIRAD and INRAE). We  
339 acknowledge stakeholders that participated in the process, especially farmers involved in the  
340 project for their time, knowledge, and patience.

341

### 342 **Figure caption**

343 Figure 1: Localization of the study sites

344

### 345 **Table captions**

346 Table 1: Main characteristics of the study sites

347 Table 2: Sources of the collected data

348 Table 3: Input data used for the simulated scenarios

349

### 350 **References**

351 Agreste, 2020. Memento de la Statistique Agricole, Région Occitanie.

352 [https://draaf.occitanie.agriculture.gouv.fr/IMG/pdf/memento\\_creator\\_cle0446e3.pdf](https://draaf.occitanie.agriculture.gouv.fr/IMG/pdf/memento_creator_cle0446e3.pdf)

353 [accessed 2020, Decembre 22th)

354 Agreste Conjoncture Viticulture, 2020. Infos rapides n°2020-158.

355 <https://agreste.agriculture.gouv.fr/agreste>

356 [web/download/publication/publie/IraVit20158/2020\\_158inforapviticulture.pdf](web/download/publication/publie/IraVit20158/2020_158inforapviticulture.pdf)

357 [accessed 2020, Decembre 22th)

358 AsoExport, 2020. Café en cifras – novembre 2020 | AsoExport [accessed 28 December 2020]

359 Béteille, R. 2020. [https://www.banquedesterritoires.fr/plan-de-relance-la-filiere-viticole-](https://www.banquedesterritoires.fr/plan-de-relance-la-filiere-viticole-attend-de-nouvelles-mesures-pour-surmonter-la-crise)

360 <attend-de-nouvelles-mesures-pour-surmonter-la-crise> [accessed 2020 August 5th]

361 Carbon Brief, 2020. <https://www.carbonbrief.org/> [accessed 2020 June 25th]

362 Cardebat, J. M., Masset, P., Weisskopf, J. P. 2020. COVID-19: What is Next for the Market  
363 for Fine Wines?. Available at SSRN 3636317.

364 Chambre Nationale d'Agriculture du Burkina Faso, 2020. Impacts du Covid-19 sur le secteur  
365 agropastoral, SEM le Président du Faso apporte des mesures de soutien aux  
366 producteurs <https://cna-burkina.org/spip.php?article110>

367 Chirinda, N., Carter, M.S., Albert, K.R., Ambus, P., Olesen, J.E., Porter, J.R., Petersen, S.O.  
368 2010. Emissions of nitrous oxide from arable organic and conventional cropping  
369 systems on two soil types. *Agriculture, Ecosystems and Environment* 136, 199–208.

370 CILLS, 2020. Impact de la crise du covid-19 sur la sécurité alimentaire et nutritionnelle au Sahel et en  
371 Afrique de l'ouest, n°3, juin 2020 [https://www.cilss.int/index.php/2020/07/15/note-](https://www.cilss.int/index.php/2020/07/15/note-dinformation-et-de-veille/)  
372 [dinformation-et-de-veille/](https://www.cilss.int/index.php/2020/07/15/note-dinformation-et-de-veille/)

373 CNIV, 2020. Chiffres clés. <https://www.intervin.fr/etudes-et-economie-de-la-filiere/chiffres-cles>  
374 [accessed 9 September 2020]

375 COMMODAFRICA, 2020. Le marché du coton peut-il se redresser après le choc violent de la Covid-  
376 19 sur la demande ? [http://www.commodafrica.com/24-06-2020-le-marche-du-coton-peut-il-](http://www.commodafrica.com/24-06-2020-le-marche-du-coton-peut-il-se-redresser-apres-le-choc-violent-de-la-covid-19-sur-la-demande)  
377 [se-redresser-apres-le-choc-violent-de-la-covid-19-sur-la-demande](http://www.commodafrica.com/24-06-2020-le-marche-du-coton-peut-il-se-redresser-apres-le-choc-violent-de-la-covid-19-sur-la-demande) [accessed 2020  
378 December 28th]

379 Diarisso T., Corbeels M., Andrieu N., Djamen P., Douzet J.M., Tittonell P. 2016. Soil variability and  
380 crop yield gaps in two village landscapes of Burkina Faso. *Nutrient Cycling in*  
381 *Agroecosystems*, 105 (3) : p. 199-216. <http://dx.doi.org/10.1007/s10705-015-9705-6>

382 Dugué P., Kohio E., Tiemtoré J., 2021. L'agriculture burkinabè face à la crise de la Covid-19 : cas des  
383 régions du Yatenga et des Hauts-Bassins. *Cahiers Agricultures*. In press.

384 Edmonds B., Bachelier B., Lançon J. 2020. Potential impacts of COVID-19 on African cotton sectors.  
385 *ICAC Recorder*, 34 (2), n.spéc. Potential impacts of COVID-19 on the cotton sector : 45-48.  
386 <https://icac.org/News/NewsDetails?NewsId=2347&YearId=2020>

387 Finagro, 2020. [https://www.finagro.com.co/noticias/todo-lo-que-necesitas-saber-sobre-la-lec-](https://www.finagro.com.co/noticias/todo-lo-que-necesitas-saber-sobre-la-lec-colombia-agro-produce)  
388 [colombia-agro-produce](https://www.finagro.com.co/noticias/todo-lo-que-necesitas-saber-sobre-la-lec-colombia-agro-produce) [accessed 2020 September 9th]

389 FAO. 2020. Burkina Faso | Plan de réponse (avril-décembre 2020): Atténuer l'impact de la  
390 maladie à coronavirus 2019 (covid-19) sur la sécurité alimentaire. Rome.  
391 <https://doi.org/10.4060/ca9449fr>

392 Forbes, 2020. Contraloría: 90 % de créditos agrarios se quedan en grandes empresas - Forbes  
393 Colombia [accessed 20 April 2020]

394 Forbes, 2020. Producción colombiana de café subió 12% en junio - Forbes Colombia  
395 [accessed 2020 July 8th]

396 FranceAgriMer, 2020. Aide au stockage de vin 2020-2021 available at  
397 <https://www.franceagrimer.fr/Accompagner/Dispositifs-par-filiere/Aides-de->  
398 [crise/Aide-au-stockage-de-vin-2020-2021](https://www.franceagrimer.fr/Accompagner/Dispositifs-par-filiere/Aides-de-crise/Aide-au-stockage-de-vin-2020-2021)

399 Galbraith E., Otto R. 2020. [https://theconversation.com/coronavirus-response-proves-the-](https://theconversation.com/coronavirus-response-proves-the-world-can-act-on-climate-change-133999)  
400 [world-can-act-on-climate-change-133999](https://theconversation.com/coronavirus-response-proves-the-world-can-act-on-climate-change-133999) [accessed 9 September 2020]

401 Girard, L. 2020. [https://www.lemonde.fr/economie/article/2020/08/03/champagne-alors-que-](https://www.lemonde.fr/economie/article/2020/08/03/champagne-alors-que-les-vendanges-approchent-vignerons-et-negociants-ne-s-entendent-pas_6048006_3234.html)  
402 [les-vendanges-approchent-vignerons-et-negociants-ne-s-entendent-](https://www.lemonde.fr/economie/article/2020/08/03/champagne-alors-que-les-vendanges-approchent-vignerons-et-negociants-ne-s-entendent-pas_6048006_3234.html)  
403 [pas\\_6048006\\_3234.html](https://www.lemonde.fr/economie/article/2020/08/03/champagne-alors-que-les-vendanges-approchent-vignerons-et-negociants-ne-s-entendent-pas_6048006_3234.html) [accessed 2020 August 5th]

404 Hammer, S., Hallegatte S. 2020. [https://blogs.worldbank.org/fr/voices/developpement-](https://blogs.worldbank.org/fr/voices/developpement-durable-planifier-la-reprise-economique-post-pandemie-covid-19-une-grille-devaluation)  
405 [durable-planifier-la-reprise-economique-post-pandemie-covid-19-une-grille-](https://blogs.worldbank.org/fr/voices/developpement-durable-planifier-la-reprise-economique-post-pandemie-covid-19-une-grille-devaluation)  
406 [devaluation](https://blogs.worldbank.org/fr/voices/developpement-durable-planifier-la-reprise-economique-post-pandemie-covid-19-une-grille-devaluation)

407 Hillier, J. 2012. “CoolFarmTool.” Aberdeen, UK: University of Aberdeen.  
408 <https://coolfarmtool.org/>

409 Howlett, M. 2014. Why are policy innovations rare and so often negative? Blame avoidance  
410 and problem denial in climate change policy-making. *Global Environmental Change*  
411 29. 10.1016/j.gloenvcha.2013.12.009.

412 IPCC, 2019. Climate change and land. Summary for Policymakers.  
413 [https://www.ipcc.ch/site/assets/uploads/sites/4/2020/02/SPM\\_Updated-Jan20.pdf](https://www.ipcc.ch/site/assets/uploads/sites/4/2020/02/SPM_Updated-Jan20.pdf)  
414 [accessed 2020 June 25th]

415 Kennedy, J., Ashmore, J., Babister, E., Kelman, I., & Zarins, J. (2008). Disaster mitigation  
416 lessons from ‘build back better’ following the 26 December 2004 Tsunamis. *Water*  
417 *and Urban Development Paradigms: Towards an Integration of Engineering, Design*  
418 *and Management Approaches*, Taylor and Francis, London, 297-302.

419 Kobiane J-F, Soura B A, Ouili I, Kaboré I et Guissou L., 2020. Les inégalités au Burkina Faso  
420 à l’aune de la pandémie de la covid-19 : quelques réflexions prospectives. Collection «  
421 Papiers de recherche », AFD Editions, 72 p. [https://www.afd.fr/fr/ressources/les-](https://www.afd.fr/fr/ressources/les-inegalites-au-burkina-faso-laune-de-la-pandemie-de-la-covid-19-quelques-reflexions-prospectives?origin=/fr/ressources-accueil)  
422 [inegalites-au-burkina-faso-laune-de-la-pandemie-de-la-covid-19-quelques-reflexions-](https://www.afd.fr/fr/ressources/les-inegalites-au-burkina-faso-laune-de-la-pandemie-de-la-covid-19-quelques-reflexions-prospectives?origin=/fr/ressources-accueil)  
423 [prospectives?origin=/fr/ressources-accueil](https://www.afd.fr/fr/ressources/les-inegalites-au-burkina-faso-laune-de-la-pandemie-de-la-covid-19-quelques-reflexions-prospectives?origin=/fr/ressources-accueil)

424 larvf.com, 2020. La Champagne subit un « choc économique sans équivalent depuis la  
425 Deuxième Guerre ». *La revue du Vin de France*, 12 Octobre 2020.  
426 [https://www.larvf.com/la-champagne-subit-un-choc-economique-sans-equivalent-](https://www.larvf.com/la-champagne-subit-un-choc-economique-sans-equivalent-depuis-la-deuxieme-guerre,4703550.asp)  
427 [depuis-la-deuxieme-guerre,4703550.asp](https://www.larvf.com/la-champagne-subit-un-choc-economique-sans-equivalent-depuis-la-deuxieme-guerre,4703550.asp) [accessed 2020 December 28th]

428 Lang, 2020. Coronavirus: la filière fruits et légumes lance un appel à la main d’œuvre.  
429 Franceinfo, 25 March 2020. [13](https://france3-regions.francetvinfo.fr/grand-</a></p>
</div>
<div data-bbox=)

430 est/marne/reims/coronavirus-filiere-fruits-legumes-lance-appel-main-oeuvre-  
431 1806354.html [accessed 2020 December 28th]

432 LesEchosInvestir, 2020. source: [https://investir.lesechos.fr/marches/matieres-  
premieres/produits-agricoles.html](https://investir.lesechos.fr/marches/matieres-<br/>
433 premieres/produits-agricoles.html) [accessed 2020 December 28th]

434 Le Quéré, C., Jackson, R. B., Jones, M. W., Smith, A. J., Abernethy, S., Andrew, R. M., De-  
435 Gol, A.J., Willis, D.R., Shan, Y., Canadell, J.G., Friedlingstein, P., Creutzig, F., Peters,  
436 G.P. 2020. Temporary reduction in daily global CO<sub>2</sub> emissions during the COVID-19  
437 forced confinement. *Nature Climate Change*, 1-7.

438 OEA, 2020. Retos de las mujeres rurales en Colombia frente a la COVID-19.  
439 <https://www.oas.org/es/cim/docs/DocumentoPosicion-MujeresRurales-FINAL-ES.pdf>

440 Omnes, G., 2020. Coronavirus : qui sont les gagnants et les perdants sur le marché des  
441 céréales ? Réussir Grandes Cultures, 5 May 2020. [https://www.reussir.fr/grandes-  
443 cultures/coronavirus-gagnants-perdants-les-marches-des-grandes-cultures-covid-19](https://www.reussir.fr/grandes-<br/>
442 cultures/coronavirus-gagnants-perdants-les-marches-des-grandes-cultures-covid-19)  
[accessed 2020December 28th]

444 PAM, 2020. Afrique de l’ouest et du centre. Situation des marchés face au covid-19, Bulletin  
445 régional du PAM, Dakar, Avril 2020. [http://www.food-security.net/wp-  
content/uploads/2020/05/WFP\\_RBD-Impact-des-mesures-conte-le-COVID-19-sur-la-  
situation-des-march%C3%A9s\\_Avril2020-003.pdf](http://www.food-security.net/wp-<br/>
446 content/uploads/2020/05/WFP_RBD-Impact-des-mesures-conte-le-COVID-19-sur-la-<br/>
447 situation-des-march%C3%A9s_Avril2020-003.pdf)

448 PR-PICA, 2020. Bulletin d’information du programme régional de production intégrée du  
449 coton en Afrique. 19. [http://www.prpica.org/spip.php?article100\\_\\_](http://www.prpica.org/spip.php?article100__)[accessed  
450 2020December 28th]

451 Richards, M., R. Metzel, N. Chirinda, P. Ly, G. Nyamadzawo, Q. Duong Vu, A. de  
452 Neergaard, et al. 2016. “Limits of Agricultural Greenhouse Gas Calculators to Predict  
453 Soil N<sub>2</sub>O and CH<sub>4</sub> Fluxes in Tropical Agriculture.” *Scientific Reports* 6 (1): 1–5.  
454 <https://doi.org/10.1038/srep26279>.

455 UNO Info (United Nations Organization), 2020. Covid-19: the pandemic threatens to push  
456 130 millions more people into extreme poverty.  
457 <https://news.un.org/fr/story/2020/11/1082722> [accessed 2020 December 28th]

458 Trésor Direction Générale, 2020. Brèves Economiques d’Afrique de l’Ouest, N°353 du  
459 22/05/2020. [https://www.tresor.economie.gouv.fr/Articles/ecfecdc0-d0da-44bf-88a5-  
a77b2eab71f7/files/028f16e4-c763-44b4-93a9-05e51077d110](https://www.tresor.economie.gouv.fr/Articles/ecfecdc0-d0da-44bf-88a5-<br/>
460 a77b2eab71f7/files/028f16e4-c763-44b4-93a9-05e51077d110)

461 Vitisphère, 2020, Les ventes de Champagne ont chuté de 80 % en mars et avril – published on  
462 30 avril 2020 available at [https://www.vitisphere.com/actualite-91604--Les-ventes-de-  
Champagne-ont-chute-de-80-en-mars-et-avril-.htm](https://www.vitisphere.com/actualite-91604--Les-ventes-de-<br/>
463 Champagne-ont-chute-de-80-en-mars-et-avril-.htm)

464 Vitisphere 2020. [https://www.vitisphere.com/actualite-92060-Laide-au-stockage-prive-reste-](https://www.vitisphere.com/actualite-92060-Laide-au-stockage-prive-reste-encore-a-definir.htm)  
465 [encore-a-definir.htm](https://www.vitisphere.com/actualite-92060-Laide-au-stockage-prive-reste-encore-a-definir.htm) [accessed 2020 August 5th]  
466 Zapalski, 2020. L'appel aux bras pour travailler dans les champs se solde par un echec.  
467 Localtis-France, 18 May 2020. [https://www.banquedesterritoires.fr/lappel-aux-bras-](https://www.banquedesterritoires.fr/lappel-aux-bras-pour-travailler-dans-les-champs-se-solde-par-un-echec)  
468 [pour-travailler-dans-les-champs-se-solde-par-un-echec](https://www.banquedesterritoires.fr/lappel-aux-bras-pour-travailler-dans-les-champs-se-solde-par-un-echec) [accessed, 2020December  
469 28th]



Table 1

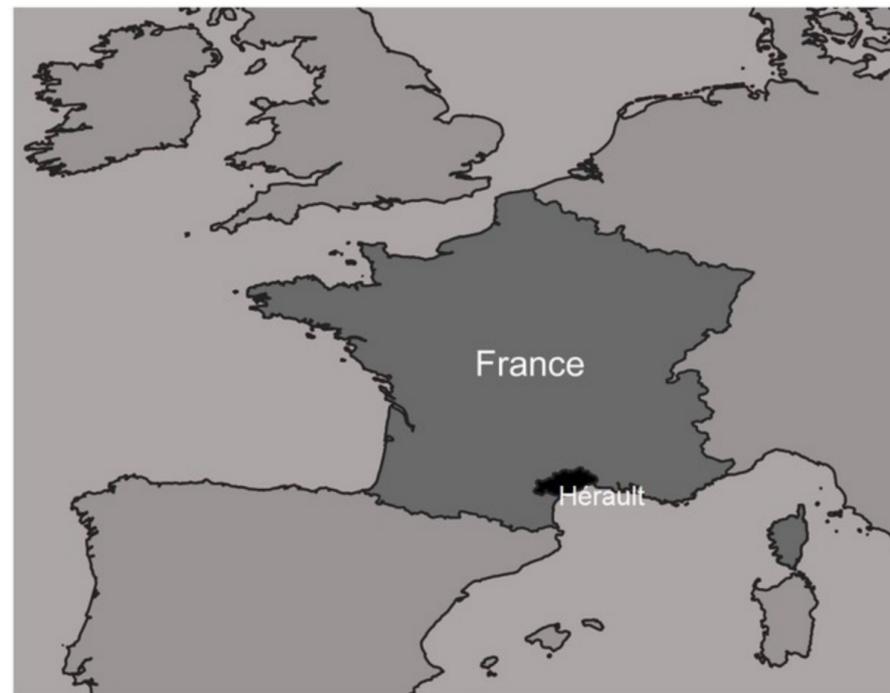
	<b>Burkina Faso</b>	<b>Colombia</b>	<b>France</b>
Province	Hauts Bassins Region	Cauca	Herauld NUTS-3
Main cash crops	Cotton	Coffee	Vine
First lockdown period	21 March to 4 May	21 March to 31 August	17 March to 11 May

Table 2

		<b>Burkina Faso</b>	<b>Colombia</b>	<b>France</b>
Farmers	Surveys	15/24	20/5	4/0
	Main /other value chains			
	Questions asked	1. Did the covid-19 pandemic impact your farming activities? 2. If, yes what were these impacts?		
	Other sources	1 peer-reviewed article 2 public institutions reports	1 press release 2 NGO release	5 press releases 2 NGO release
Actors from the value chains	Number of surveyed	7/35	0	4/0
	Main /other value chains			
	Questions asked	1. Did the covid-19 pandemic impact your agriculture-related activities? 2. If, yes what were these impacts?	0	What was the impact of covid-19 on selling? (level, type, price, timing)
	Other sources	2 Press releases 3 Public institution releases	1 press release 2 government release 1 peer-reviewed article	1 press release 2 government releases

Table 3

	<b>Burkina Faso</b>	<b>Colombia</b>	<b>France</b>
Scenario	Decrease of the cotton areas of 22 000 ha with resulted in a 9,240 t reduction of cotton fibre production compared to the same period in 2019	Decrease of 55 500 t of coffee exported from January to November 2020 compared to the same period in 2019	Decrease of 2133 HL of wine exported from February to November 2020 compared to the same period in 2019
Average quantity fertilizer rate for the main cash crop	150 kg/ha NPK (14-18-16) 50 kg/ha urea 46%	-	-
Yield for the main cash crop	420 kg/ha	-	-
Estimated distance to the main ports of importation	1,000 km from Burkina to Tema port in Ghana and then 22,698 km from this port to the port of Shanghai, China	256 km from Cauca to Buenaventura port 4,332 km from Buenaventura port to New-York (leading coffee export destination)	170 km from Herault to Marseille port 3,500 km, corresponding to France's average distance to three main ports in Europe, the US, and China.



[There were no major changes in agricultural practices  
Policy measures aimed at maintaining input use  
Decrease in Coffee exports led to a decrease of 4,862 t  
CO2 eq emissions emissions]

[There were no major changes in agricultural practice  
but changes in market strategies for vine growers  
Policy measures aimed at alleviating the markets from  
large stocks  
Decrease in wine exports led to a decrease of 14 t CO2  
eq emissions emissions]

[There were no major changes in agricultural practices  
Policy measures aimed at maintaining input use  
Decrease in Coton areas of 22 00 ha led to a decrease in  
the use of fertilizers and of exports and to a decrease of  
29,194 t CO2 eq emissions]