

Diversifying revenue in rural Africa through circular, sustainable, and replicable biobased solutions and business models

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D1.1: Contexts and needs of African rural communities

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List of acronyms

UASZ	UNIVERSITE ASSANE SECK DE ZIGUINCHOR			
INP-HB	INSTITUT NATIONAL INNOVATION HUB			
SAVANET	SAVANNAH YOUNG FARMERS NETWORK			
AFAAS	AFRICAN FORUM FOR AGRICULTURAL ADVISORY SERVICES			
ihub	AGRI BUSINESS INNOVATION HUB			
0kmNomads	OKMNOMADS.ORG			
GHC	Ghanaian cedi			
USh	Ugandan shilling			
CFA	West African franc			
SIE	Sustainable Innovations Europe			





EXECUTIVE SUMMARY

This report presents the Contexts and needs of Ghanian, Senegalese, Ivorian and Ugandan rural communities' of BIO4AFRICA H2020 project (contract no. 101000762) corresponding to D1.1 (M6) led by SIE. It presents a detailed description of the methodology and outcomes resulting from the interview-based surveys developed and defined by SIE and distributed by local partners (UASZ, AFAAS, INP-HB, SAVANET) across Senegal, Uganda, Côte d'Ivoire, and Ghana. Before disclosing survey results, the methodology followed for survey distribution and feedback collection, as well as the action plan set for conducting Task 1.1. activities are provided in this document.

The methodology comprised of three main parts: a) key topics and survey definition, b) survey distribution and c) results gathering and monitoring to compile the final report. At M1, a kick-off meeting with Task 1.1. contributors were held to align expectations for the work to be carried out and set deadlines for survey definition and distribution. Hereinafter, a first survey draft was shared and validated by local partners (UASZ, AFAAS, INP-HB, SAVANET), reviewed by WP co-leader AATF and other project partners in parallel. The document served as a basis for the training session (M3), where local partners discussed key aspects to consider during survey distribution. The survey distribution run from July 15th, 2021, to September 30th, 2021 (M4-M5). The collection of surveys has been a continuous task monitored by SIE from M4, gathering inputs and asking for additional information when needed.

The total sample size gathered on this study was of 168 respondents (30 from Senegal, 15 from Ghana, 18 from Uganda, 105 from Côte d'Ivoire), comprising different target groups where farmers, Agri-entrepreneurs and national agricultural associations and supporting organizations can be found.

The results showed general awareness of the existence of bio-based solutions and approaches in agriculture, and most respondents were already implementing a more bio-based traditional approaches employing food components for compost and biofertilizers. The acceptance on the potential adoption of bio-based approaches within the farm operative is widely accepted and positively perceived if this comes with a high-quality price ratio to face initial investment in machinery and training of workforce.

Women usually play a predominant role on household decisions and are usually the main interest by national scheme programs for loan and credit aids. However, most of women farm owners were usually widows or agribusiness professionals owning postgraduate educational degrees, comprising not even a 1% out of the total respondents addressed across regions, with particularly low participation ratios in Senegal and Ghana. Factors such as lack of competitive salaries and social isolation are shown as the most important barriers faced by women when performing daily business activities.

The lack of direct government supporting schemes for providing loans, and indirect subsidies (tax breaks or incentives) as well as lack of access to mechanization services on equipment and tools and present low prices set for raw materials supplied are amongst the most important limiting factors across regions. Intercommunications between supply chains from villages and communities around are mostly nonexistent, considered an area of improvement for establishing effective communication channels to gather joint concerns and needs.





Certain limitations such as the lack of homogeneity in sample sizes addressed across the targeted regions, the little representativeness of female respondents, and the low response ratio of questions considered sensitive for those addressed (such as the earnings generated per cattle sold) are considered limitations for the development of the survey study and the drawing of conclusions.

This report is public and aims to reach different audiences, including the public, scientific community, industry, and policymakers with the objective to maximize project results and disseminate the outputs throughout project duration.





1. INTRODUCTION TO THE OBJECTIVES

The outcomes reported in this report were drawn from research conducted based mainly on two interlinked sets of objectives. First, it relates to the objectives set under Task 1.1 and secondly to the overall BIO4AFRICA project goals.

The BIO4AFRICA context

The *Context and Needs for African rural communities'* report is part of Task 1.1. Analysis of the needs and contexts of target farmers and rural communities with a gender lens (M1-M6), enclosed in WP1 Needs analysis, technology screening and knowledge integration with rural African communities.

Results under task 1.1 are considered as a pre-step for Task 1.4 (Co-definition of technologies to be transferred with local farmers and communities, starting M6) and Task 1.5 (Identification of funding and financing options for bio-based business deployment, starting M6), which knowledge from results obtained about the context of agricultural activities performed within the targeted areas will be valuable for its deployment.

The following figure explains the WP1 roadmap discussed at M1, to establish links between different tasks and their contribution to subsequent WPs.



Figure 1. Roadmap of activities (M1-M20)





Task 1.1 aims to shed light on the context of the target farmers and rural communities in Africa by means of desk research and interviews, enabling us to gain a deeper understanding of their needs and challenges.

Research objectives

The results and conclusions outlined in this report are mainly based on desk research and research conducted from primary sources, via the definition and distribution of an interview-based survey, aiming to provide a more in-depth first-hand perspective from farmers and rural stakeholders on the ground.

The main research objectives of the survey study are:

- Provide a realistic view on the degree of technology adoption of those technologies targeted in for BIO4AFRICA's pilot cases, offering better insights on the businesses and farming facilities characteristics to encourage sustainable growth in rural communities.
- Potential involvement of different stakeholders reached, (farm owners of different farm types and sizes, supporting networks and governmental bodies), in future activities developed under the project, such the BIO4AFRICA Accelerator programme.

The two main expected impacts disclosed in BIO4AFRICA's work plan, targeted in this report, are 5) *"In the longer term, results will contribute improving livelihoods, enhancing food security, increasing community resilience, and reducing rural migration"*; and 6) *"Projects should also contribute increasing the innovation capacities of participating organizations and reinforcing the scientific collaboration between EU and Africa"* (BIO4AFRICA GAP Impact section, s.f.).

Below, a survey factsheet is disclosed, summarizing results and survey rationale for surveys conducted in the four targeted regions. This was also a practice made per targeted region individually.

Survey name	Contexts and needs of African rural communities
Responsible partners	Task leader: SIE
	Task co-leader: AATF
	Local partners: UASZ (Senegal), AFAAS (Uganda), INP-HB (Ivory Coast), SAVANET (Ghana).
Population (respondent profile)	Farmers, Agri-entrepreneurs, organizations
Sample size	168 respondents

Table 1. Survey factsheet (General view)





	 154 Farmers (105 in Côte d'Ivoire, 6 in Uganda, 15 in Ghana, 28 in Senegal) 7 Agri-entrepreneurs, not devoted to farming activities¹ (5 in Uganda, 2 in Senegal) 7 Other supporting organizations, such as government agency employees and bodies (7 in Uganda).
Fieldwork date	15/07/2021 – 15/09/2021
Number of questions	57
Estimation completion time	20-30 minutes
Question scale	Likert scale, Multiple choice questions, Demographic, Ranking, Rating scale, Open-ended.

In the section 3, the survey methodology is explained, covering the rationale when defining questions and key considerations per country, distributing the survey across the regions, and monitoring and gathering primary data.

2. SECONDARY RESEARCH ON CONTEXT AND NEEDS

A PESTEL Analysis (Francis Aguilar, 1967) has been used as strategical framework to analyze the macroenvironmental factors (Political, Economic, Social, Technological, Environmental and Legal) impacting target farmers' activities and the context of rural communities in Africa, more specifically in Uganda, Ghana, Ivory Coast and Senegal.

This preliminary assessment, based on desk research, allowed the team to examine how, why and under which circumstances these key factors could act as a barrier or an enabler for the uptake of bio-based solutions.

Political factors

The political assessment includes governments most significant policies on agriculture, analysis on the political stability of the target countries, and public subsides.

¹ According to the general definition given by the NAP, Farming activities refers to the cultivation and processing of farmland to produce crops, fruits, vegetables, plant species. <u>https://www.nap.edu/read/25260/chapter/6</u>

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Government Policy.

A government policy is a rule or principle that better guides decisions, resulting in positive outcomes that enhance the community or unit. Government policies contain the reasons things are to be done in a certain way and why. For each of the target countries a glimpse of the overarching agriculture policy framework is presented.

In the case of Ghana, the national economic plan, known as "Ghana Vision 2020" launched in 1995, envisions Ghana as the first African nation to become a developed country between 2020 and 2029 and a newly industrialized country between 2030 and 2039 through the integration of science and technology in governmental programmes, including in the agricultural sector.

The Ghana Shared Growth and Development Agenda (GSGDA 2010-2013) focused on supporting oil and gas development, with investments in infrastructure, energy, housing, and agricultural modernization. GSGDA social policy has focused on human development, including health, education, and the fight against poverty. Among the main objectives stated in the Food and Agriculture

Sector Development Policy (FASDEP II, 2007) is the modernization of agriculture and increased productivity of Ghanaian farmers. The Medium-Term Agriculture Sector Investment Plan (METASIP 2010-2015) is the implementation plan of FASDEP II and comprises six programmes which represent Ghana's priorities, with Food Security and Emergency Preparedness and Increased Growth in Incomes being the major areas for investment. (FAO, Country fact sheet on food and agriculture policy trends - Ghana, 2015)

In the Case of Senegal, the government aims to make agriculture an engine of economic growth, as stated in the Agro-Sylvo-Pastoral Orientation Law (LOASP) voted in 2004, which constitutes the legal framework for the development of agriculture in Senegal for the next 20 years. The adoption of this law resulted in the formulation of several operational programmes such as the National Agricultural Development Programme, the National Livestock Plan and the Grand Agricultural Offensive for Food and Abundance (GOANA).

In terms of growth, the Accelerated Growth Strategy (SCA), adopted in 2008 and then included in the National Strategy for Economic and Social Development (SNDES) and the Emerging Senegal Plan (PSE), aims to double GDP and GDP per capita in 10 and 15 years, respectively. To achieve this, high potential key economic clusters have been identified, including livestock, agriculture, and agroindustry (cereals, horticulture, oleaginous and products from wild harvest), fish and aquaculture products.

The Accelerated Programme for Agriculture in Senegal (PRACAS), the agricultural component of the PSE, was launched in February 2014. It is built around the vision of a competitive, diversified, and sustainable agriculture sector.

Within the context of the agricultural policy of the Economic Community of West African States (ECOWAS) and the Comprehensive Africa Agriculture Development Programme (CAADP), Senegal has elaborated its National Agricultural Investment Programme (PNIA) and related Investment Plan for the 2011-2015 period. The IP focuses on eight specific objectives, among which the increase of inputs production and productivity; the enhancement of agricultural products value through further processing; and the improvement of market





access for agricultural products. (FAO, Country fact sheet on food and agriculture policy trends - Senegal, 2015)

In the case of Uganda, in 2007 the GoU approved the Comprehensive National Development Planning Framework policy (CNDPF), which outlined the implementation of the 30-year program Uganda Vision 2040 (2013), which is composed of: three 10-year plans, six 5-year National Development Plans (NDPs), Sector Investment Plans (SIPs), Local Government Development Plans (LGDPs), and Annual Work Plans and Budgets. The strategic objective of the first NDP (2010/2015) and its agriculture sector component, the Agriculture Sector Development Strategies, and Investment Plan (DSIP), is to restore agricultural growth as an engine to create employment, reduce poverty and increase industrialization.

The Ministry of Agriculture, Animal Industry and Fisheries (MAAIF) approved in 2013 the National Agriculture Policy (NAP) to unify the country's agriculture approach and guide the future strategies. The overall objective of the NAP is to achieve food and nutrition security and improve household incomes through coordinated sustainable agricultural productivity and value addition, better employment opportunities and promoting domestic and international trade. (FAO, Country fact sheet on food and agriculture policy trends - Uganda, 2015).

Finally in Ivory Coast, the country counts with the National Agricultural Investment Programme (PNIA) II (2018-2025), which aims to enhance the value addition of agricultural commodities while protecting the environment and the well-being of the population. (IFAD, 2020).

The PNIA is the agricultural sector stimulus program. They are structured around four strategic objectives which are: 1. Food security and sovereignty. 2. The sustainable management of cash and export crops. 3. The engagement of the private sector by strengthening investments and 4. Agricultural governance in terms of reforms of agricultural sectors, restructuring of professional agricultural organizations and the implementation of the law on rural land. (Ministère de L'agriculture et du Développement Rural, 2021).

Political Stability.

The index of Political Stability and Absence of Violence/Terrorism measures perceptions of the likelihood that the government will be destabilized or overthrown by unconstitutional or violent means, including politically motivated violence and terrorism. The index is an average of several other indexes from the Economist Intelligence Unit, the World Economic Forum, and the Political Risk Services, among others.









Political stability index (-2.5 weak; 2.5 strong) in Sub Sahara Africa: The average for 2020 based on fortyseven countries was -0.64 points. The target countries values were Ghana: 0.13, Senegal: -0.02, Uganda: -0.78 and Ivory Coast: -0.98. Compared with others African countries the highest value was in Botswana: 1.09 points and the lowest value was in Somalia: -2.52 points. (The World Bank, 2021).

Public subsides.

There is convincing evidence that social protection is critical in lifting people out of extreme poverty, yet few people in low- and middle-income countries have access to adequate social protection. Social protection benefits (SDG indicator 1.3.1) include benefits for children, mothers with new-borns, persons with severe disabilities, unemployed people, older people, and vulnerable people covered by social assistance. Coverage means either receiving a cash benefit or contributing to a social security scheme. (IFAD I. F., 2021) In the case of Africa, the percentage is significantly lower than the rest of the world.



Figure 3. The small proportion of population covered by at least one social protection benefit (IFAD I. F., 2021).

In the case of Uganda, the proportion of population covered by at least one social protection benefit is around 3%, a number undoubtedly small, followed by Senegal 20% and Ghana 25%.

Political Enablers and barriers for the uptake of bio-based solutions:

Enablers:

- ✓ All the target countries have policies and programs focused on the agriculture development.
- ✓ Agriculture as economic growth engine is on the regional, national and international agenda for all the target countries.
- ✓ Diverse international organizations support the agricultural development of the target countries, providing financing, funding, and consulting in regional and national levels.

Barriers:

 Political instability could be a concern in target countries, considering the regional low score and, in the case of Uganda and Ivory Coast scores are under the regional average.





 Regarding public subsidies and social protection, the proportion of population covered by at least one social protection benefit is significantly lower than in the rest of the world. This has direct effects on agriculture development and on the uptake of bio-based solution.

Economic factors

The economic assessment includes the economic growth of the target countries, expressed as the Gross Domestic Product, the agricultural market size in Africa, target population incomes and employment.

Economic growth.

Nigeria's GDP amounted to 514 billion U.S. dollars in 2021 and records the highest gross domestic product in Africa. Regarding the target countries, Ghana was worth 74.26 billion U.S. dollars and ranks as the eighth highest on the continent. Ivory Coast, Uganda and Senegal were worth 70.99, 41.27 and 27.93 billion U.S. dollars, respectively.





Figure 4. Target Countries GDP in billion U.S. dollars (Statista, 2021)

In 2021, Libya's GDP is estimated to grow by 131 percent compared to the previous year, being the African country with the highest economic growth, For the target countries Uganda, Ivory Coast, Senegal, and Ghana are expected have a GDP growth rate of 6.3%, 6%, 5.2% and 4.6% respectively, Despite the pandemic crises African economies are growing fast. Among the countries with the highest GDP growth rate worldwide, African nations dominated the ranking. (Statista, 2021).

Figure 5. Target Countries GDP growth rate in 2021 (Statista, 2021).





As of 2020, Uganda, Ivory Coast*, Ghana and Senegal registered 24.03%, 20.67%, 18.24% and 15.82 respectively as contribution of the agricultural sector to the GDP. Compared with others African countries Sierra Leone registered the highest contribution at over 61% and Djibouti registered the lowest with 1.31% of the GDP generated by the agricultural sector. (Statista, 2021).* Data as 2019.



Figure 6. Figure 6. Target Countries Agriculture sector as a share of GDP (Statista, 2021).

Market environment.

The global agriculture, food, and beverage sector, with associated services, is worth about US\$10 trillion. In low- and middle-income countries, the agri-food sector is growing rapidly as populations increase, urbanize, and become wealthier. In Africa, for example, the agribusiness sector is projected to triple between 2014 and 2030 to reach a value of US\$1 trillion. (IFAD I. F., 2021).

The share of farming in economies falls as countries grow richer and employment diversifies – and people become willing to pay for healthier diets and environmental services. More of this economic value can be created and captured in rural economies to drive diversified and equitable livelihoods there. Across eighty-three countries, 44 million small farms in Africa and 338 million in Asia are responsible for 41 per cent of total global calorie production and for 53 per cent of the global production of food calories for human consumption. (IFAD I. F., 2021).

Population income.



Most of the income of small-scale farms in sub-Sahara Africa comes from farm and agriculture labor, for the target countries such as Uganda and Ghana, the percentage of income from on farm income reaches around 60% and 63.9% respectively. The second most important income comes from non-agricultural wages and selfemployment accounting 29% for Uganda and 21.1% for Ghana. (IFAD I. F., 2021).

Figure 7. Family farmers' income sources in selected countries. (IFAD I. F., 2021).





Gender inequalities in education, jobs, wages, physical safety and time poverty remain deeply embedded in rural societies and in how food systems function. A substantial rural wage gap between rural women and men persists. Not only does this impact the rights of women and girls and diminish their life opportunities, but it also represents a vast lost opportunity in terms of what women can contribute to economic progress in rural areas. (IFAD I. F., 2021) For the target countries Uganda and Ghana, the agricultural wage gap for women is around 58% and 33% respectively.

Figure 7. Agricultural wage gap for women – Substantial and persistent proportion of male agricultural wages earned by women (IFAD I. F., 2021)



Latin America/ Caribbean	Sub-Saharan Africa	Middle East/ North Africa	South Asia	East Asia/Pacific	
20				(Per capita gross capital formation
					Per capita income
Percent			~	\sim	Per capita consumption
»Y					
1990 2000 2010 1	990 2000 2010 1	990 2000 2010 19	90 2000 2010	1990 2000 2010	

Other indicators for Sub-Saharan Africa such as Per Capita Income, Gross Capital Formation and Consumption

remain in the lowest percentages between lowand middle-income countries.

Figure 8. Per capita indicators of low- and middleincome countries, 1990–2015. (FAO, 2017)

Employment.

Agricultural employment shares declined in the last 20 years, despite this situation, the agricultural employment share in Sub-Saharan Africa was 45% between 1990 and 1999 and decreased only a 3% dropping to 42% between 2000 and 2010. (FAO, 2017)

Figure 9. Sectoral employment shares, by region, 1990–2010. (FAO, 2017)



Economic Enablers and barriers for the uptake of bio-based solutions:

Enablers:

- ✓ African economies are growing fast. Among the countries with the highest GDP growth rate worldwide, African nations dominated the ranking, this is an enabler for the agriculture development.
- ✓ Agriculture contribution for GDP is significantly for the target countries, what makes agriculture important for the economy.
- ✓ African small farms play a key role for the world food production and supply.
- ✓ Farm income represents a significant percentage for the population of the countries.





Barriers:

- There is a clear agricultural wage gap between men and women in the target countries, representing inequality and becomes a barrier for the agriculture development.
- Low per capita income, low gross capital formation and low consumption is the rule in the target countries affecting life quality of target farmers.

Social factors

Population growth rate.

Projected growth in the world's population is expected to be concentrated in Africa and South Asia and in the world's cities. By mid-century, two-thirds of the global population will live in urban areas. Low-income countries will see large increments in the 15-24 years age group. The population will continue to grow in sub-Saharan Africa until at least the end of the century. By the year 2100, Asia and Africa are expected be home to a combined population of nine billion, out of the projected 11 billion people who will inhabit Earth. (FAO, 2017).

The only region where the maximum population size will not be reached within this century is Africa. While the region's growth rate will continue to decelerate, its population is set to continue to expand beyond the end of the century and is expected to reach more than 2.2 billion by 2050 and more than four billion by 2100. (FAO, 2017).



Figure 10. Sectoral employment shares, by region, 1990–2010. (FAO, 2017)

Annual growth rates of more than 2.5% to 2050 are also projected for Angola, Burundi, Chad, the Democratic Republic of the Congo, Gambia, Malawi, Mali, Senegal, Somalia, the United Republic of Tanzania, Uganda and Zambia. All these countries are in sub–Saharan Africa, with many of them in the central and eastern areas of the continent. The combined population of these countries reached 320 million people in 2015, and it will nearly double by 2050 and more than redouble by 2100 to reach a projected total of 1.8 billion. (FAO, 2017).

Thirty-five years from now, in 2050, more than two-thirds of all people may be living in urban areas. Changes in agriculture, notably technical progress, and the adoption of labor-saving technologies, have helped



underpin increasing urbanization. At the same time, agriculture, food, and nutrition have been, and are likely to continue be, affected by the changes brought about by urbanization. (FAO, 2017).

Figure 11. Growth in global urban and rural populations to 2050. (FAO, 2017).





Poverty incidence.

Globally, 627 million people still live-in extreme poverty, on less than US\$1.90 per day, while more than 3 billion are poor relative to the World Bank poverty rates for lower-middle- and upper-middle-income countries. Most poor people live in rural areas and most earn their incomes, at least in part, from working in the food system. Extreme poverty rates are projected to drop to around 7 per cent of the global population by 2030, with 90 per cent of the extremely poor living in sub-Saharan Africa. From this share, 70% belongs to

rural areas accounting for 306.6 million people living in extreme poverty. Moderate poverty will remain high across sub-Saharan Africa and will be predominantly in rural areas. (IFAD I. F., 2021).

Figure 12. Figure 12. Extreme poverty percentage in Sub-Saharan Africa. (IFAD I. F., 2021).



Labor Force.

Sub-Saharan Africa		38		3 4	17	20		18	
Asia		36		12	7	24	8	14	
Latin America and the Caribbean	15	12	11		38		10	12	
	2	20		40 PERCE	6 NTAGE (9	60 5)	80	:	100
On-own-farm labour Non-agrifood system wage labour									
On-farm wage labour Agrifood system self-employment									
Agrifood syst	ystem wage labour 📃 Non-agrifood system self-employment								

A study based on thirteen low- and middle-income countries across different regions shows that farming accounts for no more than half of people's labor. It also shows that, while 70-80 per cent of rural Africans engage in farming in some way, this accounts for only 41 per cent of their working time. (IFAD I. F., 2021).

Figure 13. Estimated time allocation by labor category in rural areas. (IFAD I. F., 2021).

In Sub-Saharan Africa despite recent decades of economic expansion, agriculture accounts for just over 60 percent of the region's workforce, and the contribution of agriculture to GDP is virtually unchanged. Although improvements in institutions, policies and international trade may have contributed to high economic growth rates, productivity growth in agriculture is declining, both in absolute terms and relative to industry and services. The sectoral value added per worker in Sub-Saharan Africa, in the case of Agriculture, accounted for 2.200 U.S. dollars, a value significantly lower than the rest of the world. (FAO, 2017).



Figure 14. Sectoral value added per worker, by region. (FAO, 2017).

In most sub-Saharan African countries, women have always constituted a large part of the agricultural labour force, and there have not been significant increases in their share of employment in agriculture since 1980.

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To illustrate, a target country as Senegal accounted a female share of economically active population in agriculture in 1980, 1995 and 2010 of 44.9%, 45.5% and 47.4% respectively. (FAO, 2017).

Social Enablers and barriers for the uptake of bio-based solutions:

Enablers:

✓ In most sub-Saharan African countries, women have always constituted a large part of the agricultural labor force, in Senegal women represent a significative share of the economically active population in agriculture. This is an enabler for the agriculture development despite the wage gap between women and men.

Barriers:

- A significant share of world extreme poverty is in Sub-Saharan Africa, this along with the fact that
 population will continue to grow until at least the end of the century, this turns into an important
 barrier for the development of the agriculture and the uptake of bio-based solutions.
- The sectoral value added per worker in Sub-Saharan Africa, is significantly lower than the rest of the world, having an overall impact in the economy development.

Technological factors

R&D Investment.

A commonly used indicator of a country's agricultural research efforts is 'agricultural research intensity' (ARI), which indicates national public expenditure on agricultural R&D as a share of agricultural gross domestic product (GDP). While there is no 'right' level of ARI, overall government R&D expenditure for science and technology of at least 1 percent of national GDP has been recommended. (FAO, 2017). In the case of the target countries the ARI for Ghana, Senegal, Uganda, and Ivory Coast accounted in 2016, 0.91%, 0.89 %, 0.62% and 0.50% respectively. (The ASTI Network, 2016).

In 2020, South Africa scored 32.67 out of 100 in the Global Innovation Index (GII), ranking first in Africa and 60th globally. In the case of the target countries Uganda scored: 20.54, Ivory Coast: 21.24, Ghana: 22.28 and Senegal: 23.75. Moreover, Guinea, with a score of 17.32 index points, ranked last in Africa and 130th out of 131 countries worldwide. (Statista, 2020).



Figure 15. Global Innovation Index score in Africa 2020, by country. (Statista, 2020).





The rural-urban gap in mobile internet adoption is reducing but remains substantial. The gap refers to how much less likely a person living in a rural area is to use mobile internet than a person in an urban area. (IFAD I. F., 2021). The Sub-Saharan Africa has the highest gap between all the low- and middleincome countries. (IFAD I. F., 2021).

Figure 16. Rural-urban gap in mobile internet use in low- and middle-income countries, by region, 2017-2019. (IFAD I. F., 2021).

The gender gap in mobile internet use in sub-Saharan Africa represents the second highest between all the low- and middle-income countries. Despite an overall reduction in the gender gap of mobile internet use in low- and middle-income countries from 27 per cent to 20 per cent, there are still more than 300 million fewer adult women than men using mobile internet. (IFAD I. F., 2021).





Figure 17. Gender gap in mobile use in low- and middle-income countries, by region, 2017-2019. (IFAD I. F., 2021).

Technological Enablers and barriers for the uptake of bio-based solutions:

Enablers:

✓ Regarding technological aspects there are not found enablers for the uptake of bio-based solutions.

Barriers:

- Agricultural research intensity is below 1% for target counties, turning into a barrier for agriculture and the uptake of bio-based solutions.
- The scores for the Global Innovation Index of the target countries indicates a low innovation environment, it becomes a barrier for the economy development.
- The Sub-Saharan Africa has the highest gap between all the low- and middle-income countries in mobile internet adoption and the gender gap in mobile internet use represents the second highest between all the low- and middle-income countries, a clear barrier for agriculture and the uptake of bio-based solutions.

Legal Factors

The target countries have regulations regarding agriculture practices and sector development, these regulations are the result of last year's politics and give the directions for the agri-food industry growth. Among the most significant are:







- The national economic plan, known as "Ghana Vision 2020", 1995. (Ghana).
- The Ghana Shared Growth and Development Agenda (GSGDA 2010-2013). (Ghana).
- Sector Development Policy (FASDEP II, 2007) . (Ghana).
- The Medium-Term Agriculture Sector Investment Plan (METASIP 2010-2015). (Ghana).
- Agro-Sylvo-Pastoral Orientation Law (LOASP). (Senegal).
- The National Agricultural Development Programme, the National Livestock Plan and the Grand Agricultural Offensive for Food and Abundance (GOANA). (Senegal).
- The Accelerated Growth Strategy (SCA), adopted in 2008. (Senegal).
- The National Strategy for Economic and Social Development (SNDES). (Senegal).
- The Emerging Senegal Plan (PSE). (Senegal).
- The Accelerated Programme for Agriculture in Senegal (PRACAS), 2014. (Senegal).
- National Agricultural Investment Programme (PNIA). (Senegal).
- National Development Planning Framework policy (CNDPF), 2007. (Uganda).
- Uganda Vision (2040, 2013). (Uganda).
- National Development Plans (NDPs). (Uganda).
- Agriculture Sector Development Strategies and Investment Plan (DSIP). (Uganda).
- National Agriculture Policy (NAP), 2013. (Uganda).
- National Agricultural Investment Programme (PNIA) II (2018-2025). (Ivory Coast).

Legal Enablers and barriers for the uptake of bio-based solutions:

Enablers:

✓ All the target countries have policies, programs and laws focused on the agriculture development.

Barriers:

• Law enforcement could be affected by political instability and economic and social problems.

Environmental factors

Weather.

Agriculture subsectors can be affected differently by natural hazards and disasters. Crops tend to be most affected by floods and storms; livestock is overwhelmingly affected by drought; the fisheries subsector is most affected by tsunamis and storms such as hurricanes and cyclones, while most of the economic impact on forestry is caused by floods, storms, and wildfires. In the case of Sub-Saharan Africa droughts represents the cause of the 89% agricultural production losses after medium- to large-scale disasters, followed by floods 9% and storms 2%. (FAO, 2017)

Figure 18. Agricultural production losses after medium- to large-scale disasters in Sub-Saharan Africa, by cause. 2003–2013. (FAO, 2017).



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Climate change.

The 2018 Environmental Performance Index (EPI) provides a quantitative basis for comparing, analysing, and understanding environmental performance for 180 countries. African countries did not rank high on



the 2018 EPI.). Sub-Saharan African countries score lower than any other region, occupying 30 of the bottom 44 positions. Ghana, Senegal, Ivory Coast and Uganda occupied the 124th, 126th, 139th and 145th in the world rank. Investments in clean water, sanitation, and energy infrastructure could help these countries significantly boost their scores. Rising populations in sub-Saharan Africa continue to put substantial pressure on limited environmental resources. (EPI Report, 2018).

Figure 19. Agricultural production losses after medium- to large-scale disasters in Sub-Saharan Africa, by cause. 2003–2013. (FAO, 2017).

South Africa was the most polluting country in Africa in 2019. That year, it emitted nearly 479 billion metric tons of carbon dioxide (CO2). In the case of the target countries, Uganda, Senegal, Ivory Coast and Ghana emitted 5.5, 9.8, 12.9 and 14.9 billion metric tons of carbon dioxide (CO2). In a regional scale the target countries are not into the most pollutant group. (Statista, 2021).



Figure 20. CO2 Emissions in target countries. (Statista, 2021).

Small-scale farmers are part of the solution in reducing the environmental footprint of food production. At least 30% of global farmland is managed by small-scale farmers with less than 20 hectares, and in low- and middle-income countries the share is much higher. (IFAD I. F., 2021)





Environmental policies.



According to a global survey conducted in 2020, respondents from Sub-Saharan African countries supported forests and land conservation as the most critical climate policy to be implemented. In contrast with other regions, supporting local communities, indigenous peoples, and women that are environmental stewards was supported by Sub-Saharan Africa respondents. (Statista, 2021);

Figure 21. Preferred climate policies Sub-Saharan Africa 2020. (Statista, 2021).

Environmental Enablers and barriers for the uptake of bio-based solutions:

Enablers:

- ✓ Regarding CO2 emissions, in a regional scale, the target countries are not into the most pollutant group.
- ✓ Tropical and regional conditions in target countries could be favorable for agriculture.
- ✓ African countries support environmental policies related with forests and land conservation and use of climate-friendly farming techniques., this is a clear environmental enabler for the uptake of biobased solutions.

Barriers:

- Regarding the Environmental Performance Index, Sub-Saharan African countries score lower than any other region.
- Natural risk as droughts represents the cause of the 89% agricultural production losses after mediumto large-scale disasters, this could be a barrier for the uptake of bio-based solutions.

3. SURVEY METHODOLOGY

To meet with the WP1 execution timeline (Figure 2), several internal communications between Task 1.1. involved partners took place to ensure a thorough analysis of the questionnaires collected. Key topics such as the current country context, questionnaire rationale, data management and collection sources were discussed.

The objective was to achieve the target of at least 60 interviews (>15 per targeted country) conducted by local partners in-field, drawing from a sample of farmers and rural stakeholders within their respective





countries (farmers, Agri-entrepreneurs, advisors, policy makers, supporting networks, etc.). A total of 168 survey-interviews were conducted across the targeted regions of Ghana (15), Ivory Coast (105), Senegal (30) and Uganda (18) covering more than 15 different rural communities, which will be disclosed later in more detail.

The interviews followed a semi-structured approach, conducted with the help of a questionnaire and guidelines developed by SIE. SIE supervised the whole process from definition and materials development, training, results monitoring and allocation of data.

A gender sensitive approach was adopted to explore and account for the crucial role of African women in agri-food value chains. The questionnaire was designed to include gender-related questions which allow for the collection of gender-disaggregated data. The different measures undertaken are explained later in Section 2.3: Question rationale.

The survey structure built on four main blocks: filtering questions to address demographic and profile characteristics of respondents (region, age, occupation, business field), macroenvironmental challenges and barriers faced in their context (social, economic, institutional, technical), bio-based solutions awareness and prospects (*Do respondents know about current bio-based approaches applied in their field? Would they be willing to adopt these approaches and what they might expect from them?*) and questions oriented to decision making structures within communities. The survey followed a gender lens approach, considering gender-based aspects and considerations made by respondents in the process of advancing gender equality and reduce gaps between men and women in the way of doing business within their communities.

On one hand, desk research was performed by SIE to map and assess framework conditions (e.g., social, economic, regulatory, institutional, market and political) allowing to examine how, why and under which circumstances these could act as a barrier or an enabler for the uptake of bio-based solutions in Uganda, Ghana, Ivory Coast and Senegal. Available evidence as well as lessons learnt from previous experiences from project partners were gathered and analyzed, to define a preliminary set of questions. The defined questions are later defined in more detail in Section 3: Results obtained.

After conducting preliminary desk research, the survey distribution roadmap was defined to ensure an efficient communication between SIE, AATF and local partners (UASZ, AFAAS, SAVANET, INP-HB) during the process of collection and analysis of results. Task 1.1 meetings and activities were also held for a pre-identification of survey respondents, as well as any data management practices being undertaken.

The contexts published in this report will overall contribute to have an updated, in-depth qualitative analysis of the potential for bio-based solutions and circular approaches within the African rural regions targeted within BIO4AFRICA and open opportunities for collaboration with other related projects and organizations.





At M1, a kickoff meeting was organized, where AATF and SIE discussed the proposed timeline for the subtasks undergone in Task 1.1. The figure below shows the schedule calendar to ensure project deadlines were met.



Figure 22. Task 1.1 Execution timeline

Kick-off meeting: Survey planning and designing of data collection tools

From the very beginning it was crucial to define a roadmap for coordination activities between SIE and the local partners, to avoid miscommunications and to establish the link for engagement activities.

At Month 1, a draft questionnaire with a preliminary set of questions was designed by SIE, based on preliminary desk research and previous experiences of project partners developing commercial projects in the regions of study,

From Month 2 to Month 3, the draft questionnaire went through an internal review process by local partners, where specific questions related to the demographics and social, economic context of the targeted region were considered. French translations were also conducted by SIE for the Senegal and Ivory Coast regions.

Once the survey-based questionnaire had been validated by local partners and certain project experts (CELIGNIS, CIRAD), a training session has been organized by SIE to discuss and validate key topics for survey distribution guidelines.

Defining the survey guidelines has been an important aspect to consider prior distribution, as it explains in a concise way the distribution channels, the survey running time as well as the results monitoring dynamics for the 2-month distribution period. In addition to this, SIE might consider asking local partners to retrieve

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contact names of respondents, when possible, which are disclosed in this deliverable and are kept as confidential.

Below, the initial roadmap of activities for Task 1.1 presented to local partners at T1.1 kick-off meeting is shown. The figure shows the different steps undergone by SIE and local partners, completed in due time.



Figure 23. Task 1.1 Execution timeline

Training session

After definition of the first draft of the survey-based questionnaire, a training session involving local partners was necessary in order to refine the survey structure and guarantee means of distribution and verification.

The main topics raised were discussed jointly and the main takeaways were defined in the *survey guidelines* document. This document served as reference for partners, together with the roadmap of activities (Figure 3) to kickstart survey distribution.

The following topics were considered as the main takeaways of the training session.

Minimum sample of surveys to be distributed by partner.

The objective set by the Grant Agreement was a minimum sample of 15 surveys completed by partner and targeted region. The expected outcomes could be extracted from one or several communities within the targeted region.

However, local partners were encouraged to gather as many surveys as possible. The bigger the sample, the better the accuracy of conclusions at country and community level.





Defining target groups

Target groups were also defined at this stage, considering two different targeted groups of respondents:

- respondent Type A) farmer operators and businesses, and
- respondent Type B) regulatory bodies and other supporting networks.

The possibility of creating two surveys for each specific target group has been discussed. Nevertheless, a consensus was reached to simplify the responses into a single survey format, including a filter question at Identification stage: "Which of the following categories best describe your main employment?".

The survey length, comprising 57 questions and with a completion time estimated for 20-30 minutes was considered good, considering the amount of data necessary for a thoughtful analysis. Most of local partners expressed their willingness to conduct the survey-based questionnaires in-field, guaranteeing a good ratio of engagement during survey completion.

Sensitive questions about purchasing power of farmers and biomass capture.

Some key questions, important for consideration when providing a real context on the degree of technology adoption and agricultural practices, need to be rephrased to guarantee a moderate good ratio of responses.

Finally, two questions to be included in the survey were suggested to engage the respondent while moderating the sensitivity of the information: 1) "How much you earn per Ha of cultivated land?"; 2) "How much you earn per cattle you sold?". Not asking for the overall revenues but for the profit margin received per unit could shed a light on the study.

Being aware of the potential bias resulting from asking highly aggregated data, questions were pointed out as non-mandatory, both in online and physical format. All the information regarding these questions was agreed to be gathered in a table case by case, as homogenized as possible and for informational purposes only.

It was also discussed to insert a question regarding the current biomass captured by respondent farmers, asking for what they are currently using it for. It was considered that, if farmers must divert some of the uses to bio-based products and processes, there would be trade-offs and the opportunity costs critical to consider in Task 1.4, when conducting cost-benefit analysis of targeted technologies. This question was discussed to be inserted when asking respondents which part of their daily activities cover in the value chain of the business (farming, processing, aggregation, transportation, storage, marketing...).

Survey questions about "Gender lens".

The gender lens approach had to be present and be part of a fundamental part of the interview conducted to respondents. For assuring this, different measures were followed. First, the gender of the interviewee in the Filtering Questions was included as a mandatory field. Secondly, a dedicated section encompassing different questions for both women and men were introduced (e.g., *What challenges do women face in*





farming? How are women supporting other women in taking up or expanding farming activities? What about do men?).

Both genders were asked to propose gender inclusivity strategies in agricultural activities. Local partners pointed out during the training session that a focus on "Youth" issues was also a relevant topic to introduce, as youth unemployment, one of the major issues in the African continent, is high when seeking for job opportunities in smallholder farms. It was also important to stress on the prospects of these respondents to adopt bio-based agricultural solutions.

The "Bio-based" concept

The term "Bio-based", although widely spread and adopted in Europe, was not perceived as a familiar concept in Africa from local partners' perspective. Considering this could cause certain degree of confusion before proceeding to ask questions, a short definition of *what bio-based solutions are* has been introduced within the survey, specially targeting those respondents participating in the online format.

The definition was the following:

Bio-based solutions refer to the development of any technologies, techniques and/or processes accelerating a more sustainable agriculture (e.g., producing goods from renewable biogenic material such as biomass, or other sources).

Local partners distributing surveys in-field, were already aware of the concept, so it was important to allocate the necessary time to assure that any emerging questions from the interviewees were replied in the right direction. Also, the ability to translate the "what's" concept to "what bio-based approaches can do" in the given context was open for discussion in this study and should be subject of reflection in next studies and deliverables under BIO4AFRICA.

Means of distribution

Logistics for survey distribution was considered a key point specially when conducting in-field interviews, these being subject to the location of farming facilities and the summer season.

Additionally, certain targeted respondents such as government bodies and other supporting networks might increase their respondent ratio via online.

Therefore, two formats for survey launch were created: an online survey (designed in SurveyMonkey) and an interactive word document, containing specific instructions for local partners when conducting the interviews, and to be printed when reaching farmers on-site.

• **Physical.** A consensus was reached when addressing farmers to conduct the interviews, to use the physical format as the one most likely to achieve a good response ratio. Local partners should act as interviewers and facilitators during the interview, guiding farmers through the survey questions, considering the different filtered sections. Partners in this case would have to catch the attention of farmers and help them understand and interpret the questions to collect the desired answers.





• Online. A shorter format of the questionnaire has been prepared and uploaded in *Surveymonkey* online tool. After completion, the results monitoring would be easy to track since the data would be automatically sent to SIE and therefore these could be analyzed quicker, shortening the intermediary time. SurveyMonkey was considered as an easy-to-use platform, already perceived as a familiar tool for local partners.

Translations into French

INP-HB (Ivory Coast) and UASZ (Senegal) manifested the need for survey translation into French, especially when addressing farmers in-field.

Monitoring of responses collected

It was agreed that confidentiality of respondents should be protected when analyzing and receiving survey results. A consent form, , was disclosed at the beginning of the survey for respondents to agree on the terms and conditions.

However, SIE advised all local partners to safeguard the contact points of respondents to provide proof of survey distribution, if later needed. An excel sheet was distributed to facilitate the tracking, by means of filling in the contact information of respondents, also documented on the survey. These contacts might be disclosed (or not), under previous consent, to reach and engage stakeholders in the targeted regions, for the future organization of workshops and events.

Other important considerations before survey distribution

Before closing the training session, local partners discussed around other important factors worth considering during the survey distribution period, and find mitigation actions when needed, such as:

- The ability to contact farmers during the lockdown. Local partners should be aware of the restrictions at regional level and find ways to communicate with farmers if they cannot be easily reached physically. For instance, by means of contacting them by phone.
- Seeking to reach different types of respondents. Partners were aware that, in the most optimal scenario, the answers should be as reliable as possible. Therefore, to make sure to capture a high degree of accuracy of responses, the local partners should look for a varied sample, interviewing mostly farmers, but also gathering the perspective of African rural communities from expert advisors, Agri-entrepreneurs, and other organizational support bodies.





Questions rationale

The survey was refined and was composed by a total number of 57 questions, allocated in different sections attending to a filtering criterion. Whether the respondent was Type A (farmer, agribusiness) or Type B (supporting institution), identified as male/female or was familiar or not with bio-based agricultural practices, the questions were filtered and guiding the interviewer to gather the desired responses.

The survey was composed of seven different sections. Section 1 was considered the introduction to identify the respondent type and demographic profile. Sections 2-5 aimed to respond to the macro and microenvironmental characteristics taking place in their context, considering a subsection were gender-oriented questions were introduced. Section 6 aimed to disclose and gather any current bio-based practices performed within their activity field, testing the degree of familiarity and future potential. The survey concluded with Section 7, addressing questions regarding the decision-making process of activities performed within the respondents' context.

Each section, together with the question type and characteristics is defined in more detail below.

Section 1: Identification and filtering questions

The section had the objective to group respondents according to demographic characteristics and type of business activity. In subsection 1A, questions regarding country of activity, age range, gender, level of education and business activity were asked.

Section B was only open for those respondents identified as farm operators (employee, manager, owner) and agribusiness professionals (business managers, entrepreneurs, SME owners). If respondents were identified as government agency employees or other supporting bodies, they were headed directly to Section B: Social Needs, challenges, and barriers.

In subsection 1B, a set of key questions regarding the business activity was refined and asked to respondents, putting emphasis on gathering the farm characteristics as accurately as possible. The attributes list was the following:

Question	Options	Question type
Nature of ownership of the land	Private (belongs to an individual, company or cooperative); Community owned public (belongs to a community: tribe, municipality, state); Publicly owned (Government leased farms)	Checkbox (only one tick).
Amount of human capital in number of workers	<10 workers Between 10 and 50 workers	Checkbox

Table 2. Regional farms preliminary attributes list

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	> 50 workers / > 100 workers.	
Type of business activity/operations covered within the value chain.	Farming, Processing Aggregation, Transportation, Storage, Sales & Marketing, External advisory (consultancy, etc.).	Multi choice Questions
Type of livestock activities, if applied.	Dairy, Beef, Swine, Poultry, Horses, Sheep, Dairy Goats, Meat Goats, Rabbits, Fish, Aquaponics, Others (Indicate)	MCQ
Type of crops being grown in the parcel/land, if applied	Corn, Soybeans, Wheat, Small Grains (e.g., cassava, sweet potato,), Forage Species / Grass Hay / Pasture, Other energy crops, such as Haylage, Vegetable/ Fruit, Others (Indicate)	MCQ
Current use of the crops being grown, if applied	Burning, burial, Field fodder, Litter, or others Specify the percentage of crops (%)	MCQ Open Question
Type of fertilizers used on the farm.	Organic, Liquid, chemical for what type of exploitation? Compost, manure, animal droppings) Nature of fertilizers (are these organic?). Yes/No question.	MCQ Yes/No question
Farnings	Earnings nor ha of sultivated land if applied	Open question
	Earnings per head of cattle sold, if applied	

Section 2-5: Macro and microenvironmental needs, challenges, and barriers

Sections 2-5 are composed of two different subsections. In subsection A, "non-gender-oriented questions", all respondents were asked to evaluate, according to a Likert scale from 1 (not at all important) to 5 (Important), how a refined list of different social, economic, institutional, environmental, and physical factors influenced and limited their business activity.

In subsection B, gender-oriented questions were addressed concerning the specific macro/micro environmental area. More concretely, a set of three questions was asked regarding any additional difficulties and correlations when being a woman and confronting these limiting factors. For instance, in the case of *Section 2: Economic needs, challenges, and barriers*, the following questions were addressed.

"Do you think there is a relationship between difficulties in accessing capital and credit and being a woman?"

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"Do you think there is a relationship between low salaries and being a woman?"

"What would you address as the mitigation measures?"

Below, the list of limiting factors considered by section are disclosed. These limiting factors were discussed and refined by all Task 1.1 involved partners, considering desk research and in-field experience.

Economic challenges and barriers

- Lack of financial capital
- Lack of credit (e.g., Loans, other financial instruments)
- Lack of supplies (fertilizers, fuels, other key know-how)
- Lack of improved tools and/or equipment
- Lack of selling prices
- Lack of markets of opportunity (e.g., demand is very local, no opportunities to diversify business/products)
- High cost of labor
- High cost of availability of good agricultural land
- Limited shelf life of harvested products
- Limitations in logistics such as good roads, etc.

Institutional and political challenges and barriers

- Lack of direct government subsidies (Cash, Vouchers towards the purchase of agricultural inputs, Interest-free loans, among others).
- Lack of indirect government subsidies (Tax breaks, fuel, seeds, fertilizers, among others).
- Lack of government information systems and communication channels
- Education and training access, extension support
- Trust in government
- Presence or absence of regulations, standards (for approval and marketing of bio-based products)
- Level of Awareness among policymakers regarding use of bio-based solutions (technologies and techniques/processes to produce goods coming from renewable biogenic material (also called "biomass")

Physical and environmental challenges and barriers

- Transport
- Communication
- Droughts
- Temperature
- Floods
- Water supply
- Poor soil fertility




- Pests and diseases
- Logistic constraints (can include transport facilities, cold storage, etc.)

Social challenges and barriers

- Lack of land access
- Lack of collateral
- Healthcare insurance/access
- Lack of educated labor force
- Lack of access to technical advice/ external services
- Access to agricultural mechanization services
- Social insulation

Section 6: Bio-based economy solutions, barriers, and enablers

With the objective to gather any current bio-based approach or practices in the context of respondents' business activity, a list of considered bio-based techniques was brought up for partners to select, after providing a definition of a bio-based approach, specified previously on this report.

The list of bio-based techniques was the following:

- o Employment of food ingredients such as biofuels, feed components, biofertilizers, ...
- Anaerobic digestion
- Materials such as Bio-composites/ Bioplastics.
- Pyrolysis
- \circ Torrefaction
- Fermentation to e.g., enzymes, starter cultures, ethanol, lactic acid, food components,
- Hydrothermal carbonization (HTC).
 - Briquetting.
 - Green biorefinery to e.g., food or feed components and sugars.
 - $\circ \quad \text{Pelletizing.}$

Respondents who were not currently applying bio-based practices into their activity field were also asked if they were considering it.

All respondents were asked to evaluate, on a Likert scale basis, the barriers, and challenges (to be) confronted when adopting bio-based techniques.

Finally, they were asked to identify their specific needs and expectations when choosing a bio-based solution as an alternative to their traditional approaches in their field of activity.

Below, a table enumerating the different aspects, previously refined, shown to respondents during the survey-based interviews.

Table 3. List of key considerations when adopting bio-based approaches

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Considerations for adoption of bio-based solutions		
Barriers and challenges	Specific needs and expectations when shifting	
Lack of knowledge on the subject.	Higher income	
Capital cost for adoption of new approaches is considered very expensive.	Local resources valorization (food supply, feed supply, energy supply for cooking/transportation)	
Uncertainty around environmental benefits.	Superior functional performance in process or final product.	
Insufficient customer demand	More competitive price	
Restrictive laws/rules on the use of bio-based approaches/ more sustainable practices	Compatibility with existing processes.	
High cost of accessing the equipment to accelerate the adoption of bio-based approaches	Superior environmental performance	
High taxes on products coming from renewable biogenic materials/sources		
Challenges communicating the environmental benefits to the customer or stakeholders		
Feedstock or ingredient supply uncertainties.		
Uncertainty around functional performance.		
Incompatibility with existing processes.		
Regulatory challenges in placing the product on the market		
Lack of IP framework to protect patent rights in case of discovery of a bio-based innovation		

Section 7: Decision making process

Finally, the gender lens approach was also tested from both a male and female perspective. The section 7 was mandatory for all those surveyed to respond on the management style of and the organizational structure of the business.

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The nature of the decisions (when to take loans, how income is spent, what type of ingredients/products to produce, etc.) was evaluated, as well as the age and years of experience of those on the top management, considering discussions held in the training session.

Survey distribution

Survey was refined and sent for local partners to distribute in both partners on July 15th.

From that date, a period of two months of survey distribution was set. UASZ, INP-HB and SAVANET expressed their interest to conduct the surveys in-field, while AFAAS decided to conduct survey distribution via online.

SIE shared the final survey version template (both in English and French) and the survey link, together with the survey guidelines document, for consultation of local partners.

It was agreed that any barriers confronted or issues arising preventing local partners from meeting the roadmap of activities would be expressed and documented.

The results monitoring was done on a 2-week basis, where SIE was provided updates on the number of results obtained and potential issues confronted.

No major issues for meeting the deadlines set arose and SIE received all completed surveys by September 30th.

Primary data collection

A total number of 170 surveys, containing primary data from different profiles targeted, was collected from July 15th to September 30^{th,} 2021.

Personal contact details of respondents, as well as the exact location (community name) were not mandatory, however local partners kept this information. Personal contact details will not be disclosed in this report but were storage in local partners' personal repositories for confidentiality and data management reasons.

Local partners were also suggested to share any images when visiting the different farm facilities. Some of them are being shown in this report in Section3: Results Obtained.

Data management

According to the storage of personal contact data, the data collected is being stored in local partners' personal repository and will not be used or disclosed publicly unless previous consent (and prior notification from local partners) is provided. This data is protected by the data protection national regulation of each country and targeted region.

The survey contents are being considered in BIO4AFRICA's D8.3 Data Management Plan.





Analysis and presentation

After gathering the survey results, SIE categorized them by communities and analyzed them, interpreting regional data accordingly. The analysis followed a descriptive statistics approach, where datasets collected were extracted from a sample aiming to represent farming habits of the regions addressed (but not aimed to be generalizable to a larger population). A description of the characteristics of responses, following the formulation of assumptions supported by open questions comprise the basis of the survey study.

4. **RESULTS**

In the following subsections, a comprehensive analysis on the main questions addressed is provided at country scale.

Several local communities have been targeted per country analyzed. It will be observed that the sample addressed for the different regions (and communities) might not be homogeneous in terms of demographic and business practices, as the different macroenvironmental and microenvironmental factors impacting agricultural practices vary widely across regions. However, common practices and trends have been observed and will be pointed out at community (in Uganda, Ghana, Ivory Coast and Senegal subsections) and country level (countries comparative subsection).

The following country-based analysis follows a structure like the subsection on Section 2.3. Question rationale to facilitate a comprehensive reading.

Linked to the results obtained, lessons learned, and areas of improvement has been mostly tracked by local partners and serve as a complementary analysis in Section 4 Conclusions.

Uganda

Survey distribution in Uganda was run by local partner AFAAS. Contrary to the rest of targeted regions, the means of distribution was carried out in a full online format, collecting a total of 18 surveys completed by a wide range of profiles, including businesses, government authorities and supporting networks.

Therefore, the core of survey results lies in the experience and perceptions from related stakeholders influencing the context and needs of African rural communities, rather than gathering direct testimonials from smallholder farmer operators, already explored in the rest of targeted regions. This aspect provides value to the present study, as it provides a different view of the sector and industry landscape.

Below, the technical survey factsheet of the survey distribution in Uganda.

Table 4. Country survey factsheet: Uganda

Uganda	Technical information
Responsible partner	AFAAS





Population (respondent profile)	Agri-entrepreneurs, supporting organizations and government bodies.	
Sample size	18 (15 surveys completed via SurveyMonkey, 3 surveys completed online via Word document)	
Fieldwork date	15/07/2021 – 15/09/2021	
Estimation completion time	20-30 minutes	
Response ratio	67% (empty answer checkbox can be found in the analysis and present a bias in results analysis)	
Question scale	Likert scale, Multiple choice questions, Demographic, Ranking, Rating scale, Open-ended.	

Demographic characteristics (Filtering questions)

For the sample analyzed, a total of 18 profiles participated in the study in Ugandan rural communities targeted. Out of the 18 participants, 14 were s male, whereas 4 were female.

The results covering gender-oriented questions will be addressed in the Gender lens approach conclusions, following the answers addressed by the four female survey participants.

Below, a technical factsheet covering the demographic characteristics of survey respondents.

Table 5. Study on demographic characteristics in Uganda

Demographic characteristic	Disaggregated responses	Average
GENDER	Male (14)	Mostly men
	Female (4)	(77% respondents)

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AGE RANGE	25-34 (4)	
	35-44 (5)	35-44
	45-54 (4)	wost recurrent average range
	55-64 (3)	
	65+ (1)	
HIGHEST	Secondary (2)	
EDUCATIONAL DEGREE	Undergraduate tertiary degree (2)	Most recurrent educational degree of respondents:
	Postgraduate degree (12)	Undergraduate degrees
	Prefer not to say (2)	

Surveys were predominantly responded by men, with an average age range of 35-44, having completed an undergraduate degree. The highest educational degree owned by smallholder farmers targeted (6 respondents) was undergraduate degrees (2 respondents), followed by secondary (2). Two smallholder farmers preferred not to say their educational level. The two farmer operators who owned an undergraduate degree said to have inherited the farm facilities.

These aspects vary significantly from other targeted region's demographic characteristics, therefore, it is expected that the business activity, as well as the macroenvironmental perceptions are coming from different mindsets, and generational way of thinking.

Business activity (Filtering questions)

As previously stated, the business profile and economic activity varied widely and was extended to different stakeholders' groups, given the distribution nature of the survey (online format) and the different age groups plus a generally high considerable educational background (most of respondents owned undergraduate tertiary degrees).

Below, an overview descripting the business activity and economic nature of respondents.

Table 6. Study on business profile in Uganda

Business activity of respondents





FARMER OPERATORS (6 respondents, 33%)	Private entity (6 out of 6, 100%)	
	 Number of workers 50% between 10 and 50 workers. 50% with < 10 workers 	
	Devoted to farming (2 out of 6, 40%) or processing (4 out of 6, 60%)	
GOVERNMENT/AGENCY EMPLOYEES	Gulu University Ugandan Ministry of Water and Environment	
(7 respondents, 39%)	Ugandan Ministry of Science and Technology United Innovations Development Center (UIDC)	
	Waste management and renewable energy company owner	
AGRIBUSINESS PROFESSIONALS (5 respondents, 27%)	Engineer in housing construction and biogas technology	
	Stove manufacturer	
	Renewable energy agricultural company owner	
	Efficient cookstove manufacturer	

The farmer operators identified were mainly devoted to the activities of farming and processing of agricultural products. Among their daily operation activities, 4 respondents out of 6 (66%) were devoted to the exploitation of livestock activities, specifically to dairy goats (3 respondents) and meat goats (1 respondent).

Regarding crop production, 5 respondents out of the total claimed as their main exploitation activity within their daily operation. Among the crops being grown, corn (2 respondents), vegetables (1), small grains (1) and forage species (1) were specified.

The current use of crops varied across respondents, with three respondents using burial as main use (in a 10-30% for two cases,10% in one case), followed by burning (2 respondents, around 10% of crops), field fodder (1 respondent,75% of crops), litter (2 respondents, in one case 10-30% and another case almost 75%). An agribusiness professional, identified as male with age range 55-64, claimed to process about 70-80% of the crops produced into high quality cassava flour.





In terms of fertilization of land, 5 out 6 respondents claimed to be using organic fertilizers, specifically for animal droppings (2 respondents) and manure (3 respondents). 3 out of these respondents using organic fertilizers, were liquid.

Finally, respondents devoted to agribusiness activities were asked about their acquisition power in terms of earnings per hectare of cultivated land, and earnings per head of cattle sold. Due to the sensitivity of the question, answers vary widely, and the nature of responses differ. 3 respondents out of 6 were prone to answer each one of both questions, were the earnings per hectare of cultivated land were specified as 71.9% of new grow profit; while the answers concerning the earnings from head of cattle sold were specified as 58.9% of net profit, 200,000 USh earned for the sale of meat goats. These figures cannot provide any assumption on the acquisition power of the farm facilities and are stated for representativeness purposes mostly.

Economic challenges and barriers

Considering the economic limiting factors already defined in Section 2, these were ranked by respondents according to their relevance within their business activity, from "not at all important=1" to "important=5".



This question was responded by 66% of participants.



Among the limiting factors with the highest rank, the lack of credit (e.g., loans, other financial instruments) and lack of financial capital were considered determinant by 75% of respondents, having a negative impact on barriers and challenges in their daily operations; followed by low selling prices, considered as important by 67% of respondents.

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The main factors not considered as limiting by respondents were limited shelf-life of harvested products, limitations in logistics such as good roads, etc. and high cost of labor, considered of low importance by 50%, 35% and 18% of respondents, respectively.

Social challenges and barriers

Considering the social limiting factors already defined in Section 2, these were ranked by respondents according to their relevance within their business activity, from "not at all important=1" to "important=5".

This question was responded by 16 out of the total of 18 responded to this question.



Figure 25. Relevance of social factors limiting business activity of sample addressed in Uganda.

Among the limiting factors with the highest rank, the lack of collateral, access to agricultural mechanization services and lack of land access were considered determinants by 65%, 38% and 38% of respondents respectively, having a negative impact on barriers and challenges in the future maintenance and sustainability of their activities.

Generally, the main factors not considered as limiting by respondents in terms of proportion were social isolation and lack of access to technical advice and external services, however it can be observed these were pointed out as very important by some respondents.

The heterogeneity in the degree of relevance given by respondents for each one of these factors was especially significant in this aspect.

Technical and environmental challenges and barriers





Considering the physical and environmental limiting factors already defined in Section 2, these were ranked by respondents according to their relevance within their business activity, from "not at all important=1" to "important=5".

This question was responded by 72% of participants.



Figure 26. Relevance of physical factors limiting business activity of sample addressed in Uganda

Generally, all factors were considered important, especially droughts, pests and diseases, logistics constraints and transport issues. The main factors registering the lowest ranks were poor soil conditions and temperature.

Limiting factors such as water supply, logistics complaints were also identified as issues moderately important, depending on the season, crop production size and supplier relationships.

Institutional challenges and barriers

Considering the institutional limiting factors already defined in Section 2, these were ranked by respondents according to their relevance within their business activity, from "not at all important=1" to "important=5".

This question was responded by 14 out of the total of 18 responded to this question.







Figure 27. Relevance of institutional factors limiting business activity of sample addressed in Uganda

Among the limiting factors with the highest rank, the lack of direct (cash, vouchers towards the purchase of agricultural inputs, interest-free loans, among others) and indirect (tax breaks, fuel, seeds, fertilizers) government subsidies were key factors considered as very relevant by most of the respondents.

Other limiting factors also considered moderately important were lack of education and training access, lack of awareness among policymakers regarding use of bio-based solutions (technologies and techniques/processes to produce goods coming from renewable biogenic material) and trust in government.

These could be considered as initial weak points to kickstart actions groups and theme-based initiatives run by local governments.

Biobased economy approach and perceptions

As previously stated, participants were guided through the concept of bio-based solutions and its integration into daily agricultural practices by means of a definition before answering specific questions.

All participants in the survey responded to this section.

Out of the total, 14 were already including bio-based economy processes/techniques into their daily activities at organizational level, while the remaining 4 did not. From these 4, only one respondent would not be considering integrating them into their field of activity.

Those respondents already integrating bio-based solutions and approaches, were specifically performing it through pyrolysis (3 respondents), briquetting (5 respondents), anaerobic digestion (3 respondents), employment of biofertilizers (2 respondents), pelletizing (2 respondents) and conversion of corn starch into packaging material (1 respondent).





Other respondents, mostly devoted to the governmental field line of action, manifested the integration of the bio-based economy approach on the current policy formulation.

The list of pre-defined barriers for the adoption of bio-based solutions to present respondents was vast, especially if those respondents were not aware of the bio-based approach concept. However, the response ratio was good.

The capital cost to be incurred for the adoption of these approaches, as well as the lack of knowledge on the subject were particularly relevant. Challenges communicating the environmental benefits to the end user and stakeholders was also brought up.

The lack of IP framework to protect patent rights and the restrictive laws and rules on the use of bio-based approaches were considered not at all important by 30% and 45% of respondents respectively, while having a wide variety of perceptions across the sample. Therefore, the results obtained for these two factors are considered non-relevant for the study as they do not disclose any particular trend.



Figure 28. Relevance of factors limiting adoption of bio-based approaches for the of sample addressed in Uganda

Among the key expectations from respondents, a superior environmental performance together with a valorization of local resources are factors that should be present when adopting these approaches and that are bringing value to respondents' daily operations. For respondents, a superior environmental performance meant a good price-quality ratio of the approach adopted (equipment or tool acquired), as the valorization of outputs generated can improve return on investment while reducing environmental footprint of their operations and being compliant with current regulations.







The compatibility with existing processes, as well as the promise of a more competitive price, are also relevant long-term drivers needed for respondents to switch into more sustainable, bio-based approaches.

Figure 29. Relevance of factors determining adoption of bio-based approaches of sample addressed in Uganda

Organizational structure

As previously stated, a variety of profiles had an impact on the decision-making process of the industry. However, most of the respondents expressed very similar opinions and perceptions on the context.

All respondents agreed that most decisions made based on organizational structure of the companies and organizations they belonged to were strategized and defined by managing directors, head of departments and company owners, mostly composed of men. In the case of those respondents devoting their farming activities to processing mostly, the opinion and decisions to be taken by the managing directors of processing factories (e.g., cassava) were also determinant.

The most popular age of these decision makers was around 46 years, with a background of at least 18 years of experience in their field of action.

Regarding farming operation activities, decision making processes led by men were accepted in 80% of cases, considering this percentage approximative and subjected to different conditions stated.

These conditions were related to the role household women play within farming facilities and communities. Males own the family properties culturally, but in practice decisions are often shared and discussed in a participatory manner in a close-community environment.

Additionally, there are important key issues for the general welfare of the community, such as healthcare and food administration and storage, which is mostly "indirectly" managed by women households.





From a business perspective, only one respondent, leading a female-owned company, stated that both business-related issues and points made by male and female employees and managers were given the same priority.

Gender lens approach conclusions

As previously introduced, 23% out of the total number of respondents were female. These four respondents were asked different questions regarding the correlation between the factors limiting their activity and their gender when facing them in their daily operations.

The four women interviewed had postgraduate qualifications and expressed to have a "privileged" management position in different areas of activity: two respondents were agribusiness entrepreneurs working for private farming facilities, while the other two respondents were devoted to cookstove manufacturing activities and waste management activities respectively.

Regarding economic limiting factors, 100% of female respondents manifested a high degree of correlation between low salaries, lack of access to credit and the fact of being a woman operating in the field.

Regarding social limiting factors, 75% indicated that there was a high level of correlation between lack of unemployment and access to healthcare and insurance and being a woman. Aspects such as social isolation and being a female those surveyed did not seem to have a direct correlation.

From an institutional perspective, access to both indirect and direct government subsidies had a medium degree of correlation in the 50% of females surveyed.

Limiting factors concerning physical and environmental issues, such as transport and temperature, did not seem to have a strong influence by 70% of the respondents, neither for female (aspects not considered relevant for 75% of female respondents). One respondent, directly devoted to farming operations, did manifested a lack of correlation of environmental limiting factors with being a woman.

Côte d' Ivoire

Survey distribution in Cote d' Ivoire was led and run by local partner INP-HB. The means of distribution was carried out in a physical format, meaning, physical meetings with the farmer operators (100% of respondents) on field.

The survey distribution process collected a total of 105 surveys across six different farm communities: Agnibilékrou (18 surveys), Azaguié-Anyama (13 surveys), Bouaké (15 surveys), Korhogo (19 surveys), Man (20 surveys) and Yamoussoukro (20 surveys).







Figure 30. Ivory Coast map: Ivorian communities addressed

The core of survey results lies in the direct experience and perceptions from context and needs of African rural communities living in those communities, gathering direct testimonials from farmer operators mostly, who also include other business activities such as transporting and sales and marketing².

Below, the technical survey factsheet of the survey distribution in Ivory Coast.

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² According to Investopedia, Marketing and sales activities refer to those activities undertaken by a company to promote the buying or selling of a product of service, including advertising, selling, and delivering products to consumers of other businesses. <u>https://www.investopedia.com/terms/m/marketing.asp</u>





Ivory Coast	Technical information
Responsible partner	INP-HUB
Population (respondent profile)	Farm operators (Farmers, Raisers, Hired managers) and Agri-entrepreneurs
Sample size	105 (surveys conducted on field via survey Word document)
Fieldwork date	15/07/2021 – 15/09/2021
Estimation completion time	20-30 minutes
Response ratio	100% (empty answer checkboxes are considered as a "Not answering/Not significant)
Question scale	Likert scale, Multiple choice questions, Demographic, Ranking, Rating scale, Open-ended.

Table 7. Country survey factsheet: Ivory Coast

Demographic characteristics (Filtering questions)

For the sample analyzed, a total of 105 individuals participated in the study in Ivorian rural communities targeted. Out of the 105 participants, 89 (85%) of the respondents were identified as male, whereas 16 (15% of the respondents) were identified as female.

The results covering gender-oriented questions will be addressed in the Gender lens approach conclusions, following the answers addressed by the eight female survey participants.

Below, a technical factsheet covering the demographic characteristics of survey respondents.

Table 8. Study on demographic characteristics in Ivory Coast

Demographic characteristic	Disaggregated responses	Trend
GENDER	Male (89)	Not balanced
	Female (16)	(85% male, 15% female)
AGE RANGE	25-34 (2)	Most respondents between
	35-44 (32)	45-54 age range.

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	45-54 (47)	
	55-64 (18)	
	65+ (6)	
HIGHEST	No formal education (45)	
EDUCATIONAL DEGREE	Primary (22)	42% of respondents with no formal education
	Secondary (26)	
	Undergraduate tertiary degree (10)	
	Postgraduate (2)	

Surveys were not considered gender balanced, with respondents on an average age range of 45-54, mostly not owning formal education. However, female respondents addressed expressed a very proactive attitude answering specifically to the survey, providing their opinions during the interview process.

The specific agricultural practices per Ivorian community addressed were captured by each interviewer groups and have been gathered by means of community reports (included in Appendix section). The images shown during the report are merely illustrative.

Business activity (Filtering questions)

An overview descripting the business activity and economic nature of respondents.

Business activity of respondents		
FARM OPERATORS	77% private-owned (81 respondents) 23% community owned public (22 respondents)	
(105 respondents, 100%)	Number of workers: - 90% with < 10 workers (95 respondents) - 10% with 10-50 workers (10 respondents) (1 respondent with > 100 workers)	
	Farming (87%) Only raising (5%)	

Table 9. Study on business profile in Ivory Coast





Storage and transportation (10%) Sales and Marketing (25%)

In this context, the sample was specifically devoted to farming activities, but also covered other additional activities within the value chain, in some cases (more than 25% of respondents) covering sales and marketing activities (direct selling and promotion operations at market entry). Additionally, two respondents out of the total claimed to cover advisory services.

Storage and transportation were also considered a usual practice, covered by 10% of respondents. 9 out of 105 respondents were only dedicated to raising, being employed by owners, and hired managers.

Among the sample, there were 62 farm owners, 3 hired managers, 9 employees and 1 entrepreneur.

Six farmers out of the total were also identified as agribusiness professionals (performing other business practices related to agriculture, other than farming or processing). More specifically, one of them claimed to own an agribusiness constituted by more than 100 workers.

Among their daily operation activities, 92 respondents out of 105 were specially devoted to farming (87%), where only a 5% of those were specially devoted to raising. Although 25% of respondents were undergoing sales and marketing activities, only 12% were specifically devoted to sales and marketing. For storage and transportation, 10% out of all respondents were including these activities together with their farming and/or marketing operations.

In the daily operative, 51 out of the total performed livestock activities, where sheep (17 respondents, 33%) and poultry (17, 33%) were amongst the most popular livestock species raised, followed by beef (5 respondents, 18%), meat goats (3, 6%), swine (2%), fish (2%) and dairy goats (2%). The raising of bees and horses by some respondents was also reported.









Figure 31. Corn crop raising practices in Ivorian communities visited

Regarding crop production, 87% of respondents out of the total claimed it as their main exploitation activity within their daily operation. Among the crops being grown, corn (44 respondents, 36%), cassava manioc (17, 14%) small grains such as soybeans and coffee (15 respondents, 12%) and other vegetables and fruits such as potato leaves, yam, or spinach (14 respondents, 11%) were amongst the most popular crops being grown. Other crops such as cocoa (11 respondents, 9%) and cashew nut (11 respondents, 9%) were also considered quite popular. Moreover, some participants added to the occasional raising of cotton and rubber trees.



Composition of crops being grown in Ivorian communities







Figure 33. Exploitation of cocoa during interview



Although most of farming production was maximized for direct selling and consumption (80% was for direct selling and 20% for own consumption, with no special differences between communities), 8% of respondents distributed among the different communities were giving additional uses to crop remaining, such as animal feeding (5%) and manure (3%).

Cattle raising was found to be mainly semi-intensive and communal (87% of respondents).



Figure 34. Semi-intensive cattle raising in Ivorian communities visited (community-owned)





In terms of fertilization of land, 28 out 105 respondents claimed to be using chemical fertilizers, comprising NPK and urea. 10% of these fertilizers were liquid, specifically foliar fertilizers. 22 respondents out of the total claimed to be using organic fertilizers, coming from manure and animal droppings. 5% of these fertilizers were liquid. 17 out of the 22 respondents using organic fertilizers were not using chemical fertilizers. More than 50% of respondents preferred not to answer this question.

Finally, respondents devoted to agribusiness activities were asked about their acquisition power in terms of earnings per hectare of cultivated land, and earnings per head of cattle sold. The answers varied widely, due to the variety of cattle and crops grown, however the economic terms are homogeneous from all answers gathered (expressed in F).

Below, a comprehensive table showing the approximate numbers of the answers received per community. The numbers refer to the average calculations made according to those survey participants responding to the question. These approximations have been shown and kept for indicative purposes only.

Approximate yearly earnings per farm facility (expressed in CFA)		
Community	Ha/ Cultivated land	Head/cattle sold
AGNIBILEKROU	Corn: 418,000	Sheep: 25,300
(15 respondents)	Cocoa: 250,000	Beef: 270,000
		Poultry: 3,500
	Corn: 2,100,000	Poultry: 3,800
AZAGUIE ANYAMA	Papaya (only 2 respondents): 3,500,000	
(11 respondents)	Potato leaves: 700,000	
	Sugar cane (only 1 respondent): 200,000	
	Sweet banana (1 respondent): 100,000	
	Corn: 113,500	Beef: 250,000
BOUAKE	Cashew nut: 200,000	Sheep: 38,000
(10 respondents)	Vegetables: 200,000	Meat goat: 25,000
	Сосоа: 300,000	
	Yam: 150,000	
		Beef: 250,000
KORHOGO	Corn: 250,000	Swine: 200,000
(12 respondents)	Rice: 400,000	Sheep: 30,000

Table 10. List of indicative average yearly earnings per community and crop/species





	Cashew nut: 200,000	Goat: 20,000
	Cotton (1 respondent): 150,000	Chicken: 5,000
MANN		Bull: 400,000
(9 respondents)	Corn: 300,000	Swine: 150,000
	Cassava: 10,000	Swine: 130,000
YAMOUSSOUKRO	Corn: 700,000	Swine: 140,000
(4 respondents)	Vegetables: 200,000	Poultry: 3,000
	Cassava: 3,500	



Figure 35. Harvesting parsley during interviews in Ivorian communities

Economic challenges and barriers

Considering the economic limiting factors already defined in Section 2, these were ranked by respondents according to their relevance within their business activity, from "not at all important=1" to "important=5".

The lack of financial capital, the lack of credit and the lack of supplies were amongst the most crucial factors limiting respondents' farming operations by most respondents. Other "important" factors, considered as such by more than 50% of total respondents, were the low selling prices (a general lack of competitiveness and distinction of products in the market), specially for products such as soybeans, cashew nut, corn, cassava, and yam. The he

ads of associations also revealed the unavailability of quality seeds, the lack of regular monitoring by supervisor structures and the damages usually occasioned by the transhumance of cattle.





The lack of improved tools (more specifically, equipment with good quality price ratio which can face the initial barriers of personnel training) was discussed, where respondents usually spoke about their expectations for more support from decision makers to improve current conditions. The high cost of labor (related to the last aspect, the usage of more advanced equipment inherently requires a higher investment in workforce) was also a topic of discussion.

The limitations in logistics such as good roads, or the limited shelf life of harvested products had more heterogenous respondents regarding the degree of importance when limiting the daily operative. 25% of respondents claimed both factors were considered very important limitations, whereas logistics limitations and limited shelf life of harvested products were considered not at all important, by 10% and 15% of total respondents respectively.



Figure 36. Relevance of economic factors limiting business activity of sample addressed in Ivory Coast

Social challenges and barriers

Considering the social limiting factors already defined in Section 2, these were ranked by respondents according to their relevance within their business activity, from "not at all important=1" to "important=5".







Figure 37. Relevance of social factors limiting business activity of sample addressed in Ivory Coast

Access and healthcare and mechanization services were the factors considered as the most crucial limiting activities, by more than 50% respondents, whether they did consider them as very important or "moderately" important.

Linked to the economic factors outlook, the lack of educated lab our force which can confront the challenges when acquiring and investing in new and advanced equipment and tools was also considered a concern among respondents.

Generally, social isolation and lack of land access were not considered major issues across the communities surveyed, where the first one was not considered a relevant limiting factor (not at all important and/or of low importance) by more than 75% of respondents out of the total. Lack of land access was considered important by a 30% of respondents, but also reflected very heterogeneous responses, where another 35% were discarding it as a barrier in their daily operative.

Technical and environmental challenges and barriers

Considering the physical and environmental limiting factors already defined in Section 2, these were ranked by respondents according to their relevance within their business activity, from "not at all important=1" to "important=5".







Figure 38. Relevance of physical factors limiting business activity of sample addressed in Ivorian Coast

Limiting factors previously defined in Section 2 such as floods were not considered important by most respondents due to demographic conditions.

Generally, transport and pests and diseases were physical factors strongly affecting business activities by more than 70% and 60% of respondents respectively.

Among the factors reflecting the most heterogeneous respondents (and therefore providing null conclusions on the degree of limitation) are communication, critically important by 23% of respondents but not at all important by an approximately 10% of participants, and water supply, considered important ("important" and/or "moderately important") by almost 50% of respondents, but not critical ("not at all important" and/or "of low importance") by 35% of the total proportion of respondents.

In this country study, another key factor limiting daily operative of farms across the targeted communities was considered: hostility of the local population, due to the occasional arising of conflicts over land between the local population and those opening pioneer fronts, as well as ethnicity conflicts. Such factor was considered a barrier by 60% of total respondents, while 15% did not consider the factor at all.

Institutional challenges and barriers

Considering the institutional limiting factors already defined in Section 2, these were ranked by respondents according to their relevance within their business activity, from "not at all important=1" to "important=5".







Figure 39. Relevance of institutional factors limiting business activity of sample addressed in Ivory Coast

In general terms, all institutional factors were considered important, limiting respondents when conducting their farming activities.

Among the limiting factors with the highest rank, the lack of direct (cash, vouchers towards the purchase of agricultural inputs, interest-free loans, among others) and indirect (tax breaks, fuel, seeds, fertilizers) government subsidies were key factors considered as very relevant by 85% and 83% of respondents respectively.

The level of awareness among policymakers regarding the use of bio-based approaches was not considered as an important barrier by 10% of respondents, who generally claimed to be supported by regulations in case of investing in a more advanced, "technological" approach to adopt more sustainable agricultural practices, although not receiving any subsidies or incentives out of it.

Biobased economy approach and perceptions

Participants were guided through the concept of bio-based solutions and its integration into daily agricultural practices by means of a definition before answering specific questions.

All participants in the survey responded to this section.

Out of the total, 23% were already including bio-based economy processes/techniques into their daily activities at organizational level, while 76% did not. From that 76%, 73% would be considering including them into their daily field of activity. The remaining 28% claimed they could first need a testing or could consider adopting it occasionally.

Those respondents already integrating bio-based solutions and approaches, were specifically performing it through the employment of biofertilizers (16 respondents), feed components (2 respondents), briquetting (1 respondent), anaerobic digestion (1 respondent), anaerobic digestion (1 respondent), employment of

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materials such as bio composites (2 respondents) and green biorefinery (1 respondent) and torrefaction and fermentation (1 respondent). Other bio-based approaches reflected on the survey study were the reforestation of plots and natural treatment of dripping honey.

Most of the previously defined barriers for the adoption of bio-based solutions were considered "important" or "moderately" important for more than 50% of respondents. The high cost of accessing equipment that can accelerate the adoption of bio-based approaches as well as its capital cost attached were considered general important barriers. The overall lack of knowledge about the bio-based industry and its benefits was also a barrier and a perception in the minds of most participants.

The lack of solid regulatory frameworks to protect IP on innovative technologies was not considered a barrier nor a reality in the daily operative of farmers.

High taxes on products coming from renewable sources and more sustainable approaches was a considered factor reflecting a wide variety of opinions and opposite responses, where 25% of respondents did not considering it important, and another 25% out of the total proportion considering it as a very relevant and present barrier in their field of activity.



Figure 40. Relevance of factors limiting adoption of bio-based approaches for the of sample addressed in Ivory Coast

Among the key expectations from respondents, a higher income was the most relevant incentive for 81% of respondents would incline to adopt bio-based approaches, followed by the potential valorization of local resources (76% of respondents)





Although all factors were considered relevant, the promise of a superior functional and environmental performance were also valued as moderately important factors to shift to bio-based techniques by most respondents across the targeted communities.



Figure 41. Relevance of factors determining the adoption of bio-based approaches of sample addressed in Ivory Coast.



Figure 42. Fishery practices during Ivorian communities' visit





Organizational structure

All respondents agreed that most decisions made based on organizational structure of the companies and organizations they belonged to were strategized and defined by farm owners, as most of sample addressed were comprising male farmers who work and manage their own land operations.

The average age of these decision makers was around 43 years, with a background of at least 15 years of experience in their field of action.

Regarding farming operation activities, decision making processes led by men were accepted in 100% of cases, considering this percentage approximative and subjected to different conditions stated. These decisions were claimed to be followed not only by workers or employees, but the survey study also reflected 8 respondents who answered "women".

Additionally, relatives from respondents also seemed to play an important role within the business and operational decisions, for advisory purposes mostly. Association meetings were also recurrent across the communities, to share experiences on recent techniques applied, organization around upcoming events and ceremonies and announcements regarding financial aids and funds.



Figure 43. Corn producer interview during visit to Sehele community





Gender lens approach conclusions

The female sample is considered low, with a 15% of respondents out of the total identified as female. These 16 respondents were asked different questions regarding the correlation between the factors limiting their activity and their female condition when facing them in their daily operations.

Among the sixteen women interviewed, 8 had no formal education, 4 primary education, 3 secondary and one owned an undergraduate tertiary degree. Ten were identified as farm owner, where three of them were widows.

Regarding economic limiting factors, 80% of female respondents manifested a high degree of correlation between low salaries, and a lack of access to credit while being a woman operating in the field.

Regarding social limiting factors, a 40% of female surveyed suggested a medium degree of correlation between the lack of employment access while being a woman in charge of farming operations. The rest of factors reflected a low level of correlation in most women's responses. Aspects such as social isolation and being a female owning a farm did not seem to have a direct correlation.

From an institutional perspective, limitations in trainings to facilitate job access demonstrated a high degree of correlation in three women addressed.

In general, limiting factors concerning physical and environmental issues, were not perceived as having a direct relation with women performing daily activities in field. Transport was the only factor considered to have a medium degree of correlation, by 25% of total respondents.

Gathering all testimonials regarding the women role on the daily operative of business activities, where most responses coincide in the predominant role of male leading both work and household decisions. In most cases, a more detailed explanation is given on the basis that culturally, women are not associated to decision making in community ecosystems.

On this regard, women role in farming activities is more linked to manure than agricultural raising and harvesting. Using animal waste as compost for the fields can also be considered a usual practice among daily women operative. Collaborating and discussing male decisions based on the selection of fertilizers, setting prices, and adjusting budgets are common practices made at household level.

Most female owning their land are linked to cooperative schemes and group insurance policies. Usually, a "women" chief is designated to speak to the rest of women cohabitants, especially regarding subsidies directed to women welfare and job opportunities. It was suggested by two different respondents that organization and equal repartition of these loans is provided, however, interests are high.







Figure 44. Some of the female respondents addressed in Ivorian communities visited



Figure 45. Interviewing spinach farmers/ raisers during lvorian communities

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Senegal

Survey distribution in Senegal was led and run by local partner UASZ. The means of distribution was carried out in a physical format, meaning, physical meetings with the farmer operators (93% of respondents) and agribusiness professionals (6% of respondents) on field.

The survey distribution process collected a total of 30 surveys. A group of dedicated interviewers conducted the study on field across the region of Zinguinchor, comprising the Diouloulou region (15 people surveyed, 11 in Kataba community, 4 in Diouloulou community), Énampore and Ziguinchor regions (4 people surveyed) and Bignona region (7 people surveyed, 2 in Coubalan community and 3 in Niamone community). Across the regions, other communities were visited and covered: Escale, Bandjikaky, Djibonker, Djilakoune, Goumel, Kandé, Koba-Selety, Kenia, Koudioubé, Koulandiang, Medina Boudialabou, Medina Daffé, Ounck, Selety and Tobor.



Figure 46. Map of Ziguinchor region and Senegalese communities addressed

The core of survey results lies in the direct experience and perceptions from context and needs of African rural communities living in the communities and regions explored on the survey study, gathering direct testimonials from farmer operators mostly, who also include other business activities such as transporting, storage, and sales and marketing.

The objective of the mission was not only to display current contexts of agricultural practices for the knowhow of the BIO4AFRICA project, but to inform the Senegalese State and national development organisms directing efforts to reinforce the Casamance region, shaken by the internal civil conflict since 1982.

Below, the technical survey factsheet of the survey distribution in Senegal.





Table 11. Country survey factsheet: Senegal

Senegal	Technical information
Responsible partner	Uganda
Population (respondent profile)	Farm operators (Farmers, Raisers, Hired managers) and Agri-businesses
Sample size	30 (surveys conducted on field via survey Word document)
Fieldwork date	15/07/2021 – 15/09/2021 Mission: 6/09/2021 – 9/9/2021
Estimation completion time	20-30 minutes
Response ratio	100% (empty answer checkboxes are considered as a "Not answering/Not significant)
Question scale	Likert scale, Multiple choice questions, Demographic, Ranking, Rating scale, Open-ended.

Demographic characteristics (Filtering questions)

For the sample analyzed, a total of 30 profiles participated in the study in Senegalese rural communities targeted. Out of the 30 participants, 29 (93%) were identified as male, only two (7%) respondents were identified as female. No reasons about the gender disparity of the respondents addressed was specified.

The results covering gender-oriented questions will be addressed in the Gender lens approach conclusions, following the answers addressed by the two female survey participants.

Below, a technical factsheet covering the demographic characteristics of survey respondents.

Demographic Characteristic	Disaggregated responses	Trend
GENDER	Male (28)	Not balanced
	Female (2)	(93% male, 7% female)
AGE RANGE	25-34 (5)	

Table 12. Study on demographic characteristics in Senegal

BIOGAFRICA



	35-44 (9)	
	45-54 (5)	35-44
	55-64 (5)	Most recurrent average range
	65+ (6)	
HIGHEST	No formal education (6)	
EDUCATIONAL DEGREE	Primary (8)	Most recurrent educational degree of respondents:
	Secondary (9)	Secondary
	Undergraduate	
	tertiary degree (6)	
	Postgraduate (1)	

Surveys were not considered gender balanced, with respondents on an average age range of 35-44, where the level of education was distributed uniformly.

Business activity (Filtering questions)

An overview descripting the business activity and economic nature of respondents.

Business activity of respondents		
FARM OPERATORS (28 respondents, 93%)	90% owners (27 respondents) 6% private-owned (2 respondents) 4% Economic Interest Group (1 respondent)	
AGRIBUSINESSES (2 respondents, 6%)	Number of workers: - 73% with < 10 workers (22 respondents) - 20% with 10-50 workers (6 respondents) - (1 respondent with > 100 workers)	
	Activities: Farming (100%)	

Table 13. Study on business profile in Senegal





Processing (10%)

Covering all value chain (storage, transportation, sales, and marketing) (33%)

In this context, the sample was specifically devoted to farming activities, but also covered other additional activities within the value chain, in some cases (more than 30% of respondents) covering sales and marketing activities.

Among the sample, there were 27 farm owners, 2 hired managers (agribusiness professionals) and one Economic Interest Group (EIG). One of the agribusiness professionals owned a company comprised by more than 100 workers.

Below, a general outlook, followed by a more detailed overview per community is provided. The complete survey report conducted by UASZ is provided in the Appendix section.

General agribusiness context

93% of respondents (28 out of the total) performed livestock activities, where beef (17 respondents, 85%), meat goats (13 respondents, 43%) and poultry (17 respondents, 43%) were amongst the most popular livestock species raised, followed by swine (5 respondents, 16%). Beekeeping activities was also reported by some respondents.

29 respondents out of the total claimed crop production as their main exploitation activity within their daily operation. Among the type of crops cultivated, corn (15 respondents, 50%) followed by cashew nut (8 respondents, 26%) and cassava (5 respondents, 16%) were amongst the most popular type of crops cultivated.

Other crops such as okra (3 respondents, 10%) and millet (3 respondents, 10%) were also considered quite popular and occasionally grown by most respondents.

The cultivation of citrus and medicinal forage species such as moringa and noni were also reported by some respondents.

Although most of farming production was maximized for direct selling and consumption (on average, 75% was for direct selling and 25% for own consumption).







Figure 47. Farm visits during survey mission

In terms of fertilization of land, 8 out 30 respondents claimed to be using chemical fertilizers, not specifying the specific type. No liquid fertilizers were reported to be used. 26 respondents out of the total claimed to be already using organic fertilizers, coming from manure, compost, and animal droppings. 18 out of the 30 respondents using organic fertilizers were not using chemical fertilizers.

Finally, respondents devoted to agribusiness activities were asked about their acquisition power in terms of earnings per hectare of cultivated land, and earnings per head of cattle sold. The answers varied widely, due to the variety of cattle and crops grown, however the economic terms are homogeneous from all answers gathered (expressed in FCFA).

Below, a comprehensive table showing an approximate set of numbers on the total answers received. The numbers refer to the average calculations made according to those survey participants responding to the question. These approximations have been shown and kept for indicative purposes only.

······································		
Average approximate yearly earnings per farm facility (expressed in CFA)		
Ha/ Cultivated land	Head/cattle sold	
Cashew nuts: 200,000 FCFA	Beef: 350,000 FCFA	
Corn: 500,000 FCFA	Poultry: 3,500-5,000	
Cassava : 75,000 FCFA (8,000 FCFA/bag)	Sheep: 38,000	
Okra: 500,000 FCFA	Meat goat: 40,000	

 Table 14. List of indicative average yearly earnings per Senegalese community and crop/species




Papaya: 500,000 FCFA (1 respondent) Sv	Swine: 250,000
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Agribusiness outlook per community

In the Coubalan community, the agricultural economy relies mainly on the primary sector (85% of economic activity comes from agriculture), comprised predominantly by the raising of peanut, rice and the exploitation of forage species. Currently, the community works on developing other product value chains such as cashew nuts, mangos, and palm oil, as well as the inclusion and promotion of more sustainable practices.



Figure 48. Coubalan community in Senegal

In the community of Niamone (Bignona region), agricultural production (mainly rice, cashew nut, corn, sesame, millet) is also combined with the usual practice of cattle raising (sheep, poultry, goats) and fishery.



Figure 49. Niamone community in Senegal (far left improved cattle while on the right is deep litter system of chicken production)

There were other communities studied where the agricultural exploitation was more focused on arboriculture, such as in the community of Diouloulou, due to lack of land surfaces for extensive agricultural. Products such as the cashew nut, mango, tangerines, oranges, lemons, or bananas. Main crop production is

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focused on tomatoes, carrots, onions, and eggplants; however, horticulture usually suffers from insufficient equipment and a general issue on water control.

Where the pluvial conditions are favorable, such as in communities like Kataba, the economy is mainly based on agricultural practices (90% of job occupations). Crop production of rice and legumes is very intensive.

In the community of Ziguinchor, cattle raising is focused on small species (sheep, swine, goats) and its breeding near natural parcs. Crop productions is focused on rice mostly. Pluvial conditions allow for potential good fishery practices and the utilization of agricultural waste (compost) on post-harvested land.

Economic challenges and barriers

Considering the economic limiting factors already defined in Section 2, these were ranked by respondents according to their relevance within their business activity, from "not at all important=1" to "important=5".

All limiting factors previously defined were considered as relevant from all respondents' perspective. However, there were key issues specially addressed.



Figure 50. Relevance of economic factors limiting business activity of sample addressed in Senegal

The lack of financial capital and the lack of improved tools and equipment to perform more advanced agricultural practices were amongst the most important factors limiting respondents' farming operations (by 90% and 80% of respondents respectively). Limitations in logistics such as good roads and the limited shelf life of harvested products were also considered strong barriers in the daily operative of farms (70% and 75% of total sample of respondents respectively).

Lack of supplies and low selling prices were also considered moderately important by 40% of respondents.

High cost of availability of land and high cost of labor were not perceived as relevant aspects to consider among the respondents, by 15% and 20% of respondents.

Social challenges and barriers

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Considering the social limiting factors already defined in Section 2, these were ranked by respondents according to their relevance within their business activity, from "not at all important=1" to "important=5".



Figure 51. Relevance of social factors limiting business activity of sample addressed in Senegal

Access and healthcare and mechanization services were the factors considered as the most crucial limiting activities, by more than 70% respondents, whether they did consider them as very important or "moderately" important.

Additionally, the lack of technical advice and external services is also perceived as a limiting factor, especially when acquiring and investing in new and advanced equipment and tools to shift to more innovative approaches as quoted by 73% of the respondents.

Generally, lack of land access and collateral were not considered major issues across the sample surveyed, where the first one was not considered a relevant limiting factor (not at all important and/or of low importance) by more than 80% of respondents out of the total. Lack of land access was considered important by a 15% of respondents, in the case of certain communities, this issue has to do with the lack of surface availability due to restraints in demographics.

Additionally, it is important to emphasize that breeding activities on cattle were claimed to be practiced, but its exploitation is much more related to social than economic practices. Sales on cattle are not a usual practice unless there is an urgent social need, or for slaughtering, having place in ceremonies.

Technical and environmental challenges and barriers





Considering the physical and environmental limiting factors already defined in Section 2, these were ranked by respondents according to their relevance within their business activity, from "not at all important=1" to "important=5".



Figure 52. Relevance of physical factors limiting business activity of sample addressed in Senegal

Limiting factors previously defined in Section 2 such as floods and droughts were not considered important by most respondents due to demographic conditions.

On average, water supply, transport, pests and diseases and logistics complaints were physical factors strongly affecting business activities by more than 75% of respondents in the three cases.

Other factors perceived as moderately important were communication, considered important and/or of moderate importance by more than 85% of respondents.

Hostility between local communities, in the arising of ethnical conflicts, were also an additional relevant factor to consider by 40% of respondents addressed in the survey study.

During the survey study, not many difficulties were encountered. However, access to some communities such as the Ounck were particularly challenging. Gathering information on the earnings gained per farmer were not always accepted by respondents and all responses were mostly approximate and vague. There were minor communication issues when reaching people surveyed caused by poor telephonic connection.

Institutional challenges and barriers





Considering the institutional limiting factors already defined in Section 2, these were ranked by respondents according to their relevance within their business activity, from "not at all important=1" to "important=5".



Figure 53. Relevance of institutional factors limiting business activity of sample addressed in Senegal

In general terms, all institutional factors were considered important, limiting respondents when conducting their farming activities.

Among the limiting factors with the highest rank, the lack of direct (cash, vouchers towards the purchase of agricultural inputs, interest-free loans, among others) and indirect (tax breaks, fuel, seeds, fertilizers) government subsidies were key factors considered as very relevant by most of the respondents.

Biobased economy approach and perceptions

Participants were guided through the concept of bio-based solutions and its integration into daily agricultural practices by means of a definition before answering specific questions.

All participants in the survey responded to this section.

Out of the total, 36% were already including bio-based economy processes/techniques into their daily activities at organizational level, while 19 did not. From those 19, 18 would be considering including them into their daily field of activity.

Those respondents already integrating bio-based solutions and approaches, were specifically performing it through the employment of biofertilizers (8 respondents) and anaerobic digestion (3 respondents).







Figure 54. Relevance of factors limiting adoption of bio-based approaches for the of sample addressed in Senegal

Most of the previously defined barriers for the adoption of bio-based solutions were considered "important" or "moderately" important for more than 50% of respondents. The restrictive laws and regulatory barriers on the use of bio-based approaches as well as the lack of knowledge on the subject were considered general important barriers.

The lack of solid regulatory frameworks to protect IP on innovative technologies, together with the current compatibility of existing, more traditional processes was considered as a challenge for those respondents already adopting bio-based solutions, such as anaerobic digestion.

Among the key expectations from respondents, a higher income was the most relevant incentive for most of respondents would incline to adopt bio-based approaches, followed by the potential valorization of local resources, and the need of a more competitive industry.







Figure 55. Relevance of factors determining the adoption of bio-based approaches of sample addressed in Senegal

Although all factors were considered relevant, the promise of a superior functional performance was also valued as moderately important factors to shift to bio-based techniques by most respondents across the targeted communities.

Organizational structure

All respondents agreed that most decisions made based on organizational structure of the farms they belonged to were strategized and defined by farm owners, as most of sample addressed were comprising male farmers who work and manage their own land operations.

The average age of these decision makers was around 51 years, slightly bigger that the rest of country analysis, with a background of at least 22 years of experience in their business activity.

Regarding farming operation activities, decision making processes led by men were accepted with "average frequency". These decisions were claimed to be followed not only by workers or employees.









Figure 56. Complementary images of respondents in Senegalese communities

Gender lens approach conclusions

The female sample was considered very low, with only two female respondents participating on the survey study. The justification for the low participation ratio was found in the cultural social hierarchy established in the regions targeted, where women are allowed to own land, but their voices are not as much recognized as of men in the case of land disputes and negotiation practices, also considering the poor mechanisms to confer them land ownership that is not inherited.

One female respondent was a family farm owner owning primary education, while the other respondent was identified as an agribusiness professional, the president of an Economic Interest Group creating and facilitating opportunities for local women to access capital to own land and property.

The correlation between the lack of access to direct government subsidies to being a woman operating in their field of activity was considered high by both, so the current lack of training to access to more professional job positions related to agricultural practices.

Regarding the role of women during the decision-making processes taking place in farm operations, most of respondents agreed that those opinions and advice coming from women are considered when having to reach consensus on crucial operations: determine the type of crop to grow for that season, direct selling of certain vegetables and grains such as papaya and cashew nut... This was a more common practice having place in family-owned businesses, where the role of women are also linked to plan and set household budgets.

Ghana

Survey distribution in Ghana was led and run by local partner SAVANET, in collaboration with iHUB and OkmNomads partners. The means of distribution was carried out in a physical format, meaning, physical meetings with the farmer operators (100% of respondents) on field.

Ghana survey distribution process collected a total of 15 surveys across three different farm communities: Nabari Community, Silinga Community and Zangum Community, 5 interviews conducted per each community addressed.





The representativeness of the target groups for the Ghanian region cannot be stated, due to the total of respondents lied in the farmer operators target group.



Figure 57. Map of Ghanian communities addressed

Therefore, the core of survey results lies in the direct experience and perceptions from context and needs of African rural communities living in those communities, gathering direct testimonials from farmer operators mostly, who might also include other business activities such as processing and marketing.

Below, the technical survey factsheet of the survey distribution in Ghana.

Table 15.	Country	survey	factsheet:	Ghana
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Ghana	Technical information
Responsible partner	SAVANET
Population (respondent profile)	Farm operators and Agri-business professionals
Sample size	15 (15 surveys completed physically by SAVANET, Okmnomads and iHUB team members following guidelines from survey Word document format)
Fieldwork date	15/07/2021 – 15/09/2021





Estimation completion time	20-30 minutes
Response ratio	100% (empty answer checkboxes are considered as a "Not answering/Not significant)
Question scale	Likert scale, Multiple choice questions, Demographic, Ranking, Rating scale, Open-ended.

Demographic characteristics (Filtering questions)

For the sample analyzed, a total of 15 profiles participated in the study in Ghanian rural communities targeted. Out of the 15 participants, 7 were identified as male, whereas 8 were identified as female.

The results covering gender-oriented questions will be addressed in the Gender lens approach conclusions, following the answers addressed by the eight female survey participants.

Below, a technical factsheet covering the demographic characteristics of survey respondents.

Demographic characteristic	Disaggregated responses	Average	
GENDER	Male (7)	Balanced	
	Female (8)	(50% male, 50% female)	
AGE RANGE	25-34 (4)		
	35-44 (0)	45-54	
	45-54 (11)	Most recurrent age range	
	55-64 (0)		
	65+ (0)		
HIGHEST	No formal education (10)		
EDUCATIONAL DEGREE	Primary (1)	33% of sample not owning formal education	
	Secondary (3)		
	Undergraduate tertiary degree (1)		

Table 16. Study on demographic characteristics in Ghana





Surveys were considered gender balanced, with respondents on an average age range of 45-54, mostly not owning formal education.

Business activity (Filtering questions)

An overview descripting the business activity and economic nature of respondents.

Table 17. Study on business profile in Ghana		
Business activity of respondents		
	100% Private entities	
FARM OPERATORS (15 respondents, 100%)	Number of workers (100% with < 10 workers)	
	Devoted to farming (100%), aggregation (2 out of 15, 13%) and processing (1 out of 15, 6%)	

The agribusiness professionals were identified as farm operators, three of them also to the activities of aggregation and processing of agricultural products. Among their daily operation activities, all respondents were devoted to the exploitation of both livestock activities and crop production.

Poultry (11 respondents, 73%) and meat goats (8, 53%) were amongst the most popular livestock activities performed, followed by sheep (5,33%), beef (3, 20%), dairy goats and dairy cattle (3, 20%). Two respondents also reported they exploited and owned two donkeys.



Figure 58. Interviews during visit to Nabari community





Regarding crop production, all respondents out of the total claimed it as their main exploitation activity within their daily operation. Among the crops being grown, corn (15 respondents, 100%), soybeans (13, 86%) rice (6, 40%) beans (6,40%), and millet were amongst the most popular crops being grown. Other crops such as okro (2, 13%), sweet potato (2, 13%) groundnut (3, 20%) and yam (1 respondent) were also stated.

The current use of crops had its 100% use in food (in a 100% for 10 respondents, in more than 75% for the remaining profiles).

In terms of fertilization of land, 5 out 15 respondents claimed to be using organic fertilizers, all from composting. None of these fertilizers were liquid. All respondents, even those using organic fertilizers, were also using chemical ones, with HPK (100%), Sulphate of ammonia (73%) and urea (66%) among the most popular.

Finally, respondents devoted to agribusiness activities were asked about their acquisition power in terms of earnings per hectare of cultivated land, and earnings per head of cattle sold. The answers varied widely, however the economic terms are homogeneous from all answers gathered (expressed in GHC). Below, a table showing the approximate numbers.

	Approximate yearly earnings per farm facility (expressed in GHC)	
Community	Ha/ Cultivated land	Head/cattle sold
	1320	2100
Nabari	5200	15500
	21000	49500
	10000	32000
	1100	1000
	1250	3500
Silinga	450	1800
	100	9500
	1750	10500
	500	12000
	500	1500

Table 18. List of indicative yearly earnings per Ghanian community and crop/species

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Zangum	700	1750
	2000	1200
	1900	1500
	1200	4000

It can be stated that the average yearly earnings per hectare of cultivated land were 7,724 GHC for the Nabari community, 810 GHC for the Silinga community and 1260 GHC for the Zangum community. In terms of earnings per head of cattle sold, these were of 20,020 GHC, 7460 GHC and 1900 GHC respectively.

Economic challenges and barriers

Considering the economic limiting factors already defined in Section 2, these were ranked by respondents according to their relevance within their business activity, from "not at all important=1" to "important=5".

All limiting factors previously defined were considered as relevant from all respondents' perspective. However, there were key issues specially addressed.

The lack of financial capital, the limited shelf life of harvested products as well as the lack of improved tools and equipment were amongst the most important factors limiting respondents' farming operations. The lack of supplies (fertilizers, fuels, other know-how), low selling prices and the lack of markets of opportunity were mostly ranked as "important" and "moderately important".





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Social challenges and barriers

Considering the social limiting factors already defined in Section 2, these were ranked by respondents according to their relevance within their business activity, from "not at all important=1" to "important=5".



Figure 60. Relevance of social factors limiting business activity of sample addressed in Ghana

In this context, there were limiting factors such as social isolation and lack of land access not considered important for most of the respondents (more than 40% out of the total sample considered them as "not at all important"). The lack of educated labor was not considered a relevant factor by any of the respondents.

On the contrary, the accessibility to agricultural mechanization services and healthcare insurances were considered as very important factors for the 100% of respondents, followed by the lack of access to technical advice and external services (considered important by 14 out of 15 respondents).

Institutional challenges and barriers

Considering the institutional limiting factors already defined in Section 2, these were ranked by respondents according to their relevance within their business activity, from "not at all important=1" to "important=5".







Figure 61. Relevance of institutional factors limiting business activity of sample addressed in Ghana

Among the limiting factors with the highest rank, the lack of indirect government subsidies (tax breaks, fuel, seeds, fertilizers), the level of awareness among policymakers regarding the use of bio-based solutions and education and training access were key factors considered as very relevant by 100% of respondents.

Additionally, the lack of direct subsidies (cash, vouchers towards the purchase of agricultural inputs, interestfree loans, among others) and the existence of regulations and standards for approval and marketing of biobased products were also considered moderately important by more than 50% of respondents.

The trust in government was considered moderately important for most of the respondents (more than 60% of respondents), but not the priority when taking actions to improve context needs.

Technical and environmental challenges and barriers

Considering the physical and environmental limiting factors already defined in Section 2, these were ranked by respondents according to their relevance within their business activity, from "not at all important=1" to "important=5".







Figure 62. Relevance of physical factors limiting business activity of sample addressed in Ghana

All factors, except from droughts, were considered of high relevance. The logistic constraints (difficulties of access claimed by suppliers in the past) as well as pests and diseases (because caused by the recent COVID-19 outbreak) were emphasized by most respondents.

Biobased economy approach and perceptions

As previously stated, participants were guided through the concept of bio-based solutions and its integration into daily agricultural practices by means of a definition before answering specific questions.

Out of the total, 4 were already including bio-based economy processes/techniques into their daily activities at organizational level, while the remaining 11 did not. From these 11, 100% of them would be considering integrating them into their field of activity.

Those respondents were already integrating bio-based solutions and approaches, all respondents were specifically performing it through organic composting (crop residue, mostly from groundnut and cowpea, to feed livestock). No bio-based technologies already considered for this study (pyrolysis, pelletizing, briquetting...) were currently used or had been used in the past.

From the extensive list of defined barriers for the adoption of bio-based solutions, the high cost to access technologies which can accelerate production growth and capitalization of lands was considered an important factor for all respondents, as well as the high cost of investment in the adoption of bio-based approaches at community level.

Moreover, the lack of knowledge on the bio-based concept and the uncertainty about the benefits the adoption of new approaches can bring to the environment were also topics of discussion, considered as relevant challenges needed to be faced by local authorities.







Figure 63. Relevance of factors limiting adoption of bio-based approaches for the of sample addressed in Ghana

On the opposite side, the lack of IP framework to protect bio-based innovations was not considered as an important barrier to the adoption of bio-based approaches, probably because of lack of current local institutional efforts to regulate the innovations themselves. Additionally, regulatory challenges in placing bio-based products on the market were not considered important factors, as most of the respondents had never adopted bio-based approaches before. From those who did, only one respondent out of the four adopters really considered it as an important barrier.

For those respondents not using bio-based approaches or solutions yet, the two main specific needs were the prospects of a more competitive price, and a superior environmental performance because of the investment.





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In conclusion, all aspects summarized in the preliminary list were considered relevant, however the expectation of a higher income resulting from the direct adoption of a more sustainable, bio-based approach was not expected in the short term, majorly argued by the consideration of high upfront costs for acquisition of technology.

Organizational structure

The sample addressed was gender balanced but not diverse in terms of business activity. As previously stated, all respondents were farm operators specially covering farming activities, with three respondents covering other operations such as aggregation and processing.

All (100%) of the respondents agreed that decisions based on organizational structure of the farms and organizations were made by the "family heads", in charge of the work and social life of the family and their contribution to the community environment.

The average age of these decision makers was around 45 years, with a background of at least 22 years of experience in their field of action.

From 8 of the women addressed in the survey, only two claimed to be the family heads, considering one of them was a widow. The remaining six female respondents interviewed said their husbands were considered the family heads and therefore the decision makers in daily farming operations, although they participated in the decision-making process.

Regarding farming operation activities, decision making processes led by men were accepted in 100% of cases, considering this percentage approximative and subjected to different conditions stated. However, decisions made by females were not usually discarded at first, but sometimes considered when having to consider important aspects in everyday life that could affect the farming activities (e.g. harvesting season) such as the organization of ceremonies and children daycare.

The evidence of a gender balanced participation in farming operations was found in several aspects: 1) the planning of the harvesting season, budgeting of livestock and crop production 2) children education management, such as the selection of livelihood programmes for training and healthcare and 3) child naming ceremonies and funerals.







Figure 65. Interviews during visit to Silinga community

Gender lens approach conclusions

As previously introduced, 53% out of the total number of respondents were female. These eight respondents (2 from Nabari, 4 from Silinga, 2 from Zangum) were asked different questions regarding the correlation between the factors limiting their activity and their female condition when facing them in their daily operations.

The eight women (87.5%) interviewed did not own formal education, except from one (12.5%) respondent located in Nabari community, who owned primary education. Two female respondents from Silinga and one from Zangum were also considered agribusiness professionals apart from farm operators, performing activities such as aggregation and processing in their production. Two out of the total female respondents were family heads (from Silinga and Nabari respectively).

Regarding economic limiting factors, 50% of female respondents (4 out of 8) manifested a high degree of correlation between low salaries, lack of access to credit and the fact of being a woman operating in the field. Those female respondents not considering this correlation, claimed to have current farming saving schemes available to support their activities and condition.

Regarding social limiting factors, any respondent found a high level of correlation between lack of unemployment and access to healthcare and insurance and being a woman. Aspects such as social isolation and female condition of those surveyed seemed to have a medium to high degree of correlation in 3 out of total respondents (38%).

From an institutional perspective, access to both indirect and direct government subsidies had a high degree of correlation in the 50% of females surveyed (4 out of 8). The lack of training access to women was





considered to have a high degree of correlation by the one female respondent in Nabari, who already had primary education.



Figure 66. Interviewing during visit to Zangum community in Senegal





5. CONCLUSIONS

Survey studies were conducted with minor difficulties across the targeted regions. Poor telephone connection and difficulties in accessing certain villages by road were the only constraints faced by interviewer groups on field.

Interviewer groups commented the general proactivity of all respondents to participate, who mostly showed their enthusiasm about the benefits and good prospects the BIO4AFRICA project could bring to the development of agricultural practices in their communities. Sensitive questions were often avoided by most respondents, but approximate numbers have been shown for those who did, expressed in the report for indicative purposes only as the sample is not considered representative.

The agricultural practices regard crop raising, as well as cattle raising are determined by demographic conditions such pluvial conditions, and the availability of land surface. This is specially emphasized in Ivory Coast, where communities having more positive fluvial conditions have recently explored the development of horticultural products. In Senegalese communities addressed, cattle raising also seems to be more intensive than the other three country level regions addressed.

There is overall awareness of the existence of bio-based solutions and approaches in agriculture, and most respondents were already implementing a more traditional approach employing food components for compost and biofertilizers. In Uganda and Senegal some respondents have used techniques such as briquetting, pyrolysis and anaerobic digestion in the past. The acceptance on the potential adoption of bio-based approaches within the farm operative is widely accepted and positively perceived if this comes with a high-quality price ratio to face initial investment in machinery and training of workforce.

The respondents were predominantly male farm operators, in charge of leading the decision-making process in farming daily operations. However, the role of women seems to be slightly changing in Ivorian and Ugandan communities, where opinions related to budgeting, price setting, selection of crops coming from women are considered for reaching consensus. Women usually play a predominant role on household decisions and are usually the main interest by national scheme programs for loan and credit aids. However, most of women farm owners were usually widows or agribusiness professionals owning postgraduate educational degrees, comprising not even a 1% out of the total respondents addressed across regions. Factors such as lack of competitive salaries and social isolation are shown as the most important barriers faced by women when performing daily business activities. Overall, female engagement has been low, especially for Ghana and Senegal, and will need to probe further during our engagement in subsequent interaction for the project to ensure they are not left out

The lack of direct government supporting schemes for providing loans, and indirect subsidies (tax breaks or incentives) are amongst the most important institutional limiting factors across regions.

The lack of access to mechanization services on equipment and tools, and the low selling prices (scarce product differentiation, lack of competitiveness) are amongst the most crucial barriers harnessing local agricultural economy at community level.





Intercommunications between supply chains from villages and communities around are mostly nonexistent, making it difficult to establishing effective communication channels to gather joint concerns and needs.

It is important to notice that the results shown on this study are not eligible for inferential purposes. However, the samples collected in some of the targeted regions aim to provide a sufficient general view on the current needs and contexts on the total population for that region. In the case of Uganda, a very small sample of farm operators has been addressed (6 farm operators out of the total 18respondents) whereas in Côte d'Ivoire, 105 respondents addressed correspond to a single target group (farmer operators). Despite the difference in quantity, local partners have looked for representative groups and profiles, conducting descriptive analysis on the survey databases collected and gathering assumptions based on open questions, perceptions and suggestions made by those respondents surveyed.

From the point of view of farm operators and agribusiness professionals, concrete actions were suggested to face the current needs and barriers addressed:

- Need of more extended, precise, National based government programmes which are focused on the elimination of barriers which should cover basic needs: improvement of storage conditions for harvested products for better quality seeds and subsistence and better welfare conditions of community members.
- Supranational mechanisms (such as the BIO4AFRICA project) are currently necessary to encourage
 national schemes to empower a more competitive primary industry, through the mechanization of
 the agricultural sector. National government authorities are responsible for improving
 communication and delivery of improved tools and solutions to facilitate scale up and replication incommunity.
- Need to dynamize the role of vets within cattle raising in rural areas, in order to anticipate to pests and diseases, and therefore guaranteeing the healthcare of consumers, enabling the promotion of a healthy, local consumption of quality products.
- Direct government subsidies should concentrate in setting up a plan to not only deliver bio-based, improved tools and equipment, but a complete training programme involving community heads to confront the current lack of knowledge on the subject.

From the point of view of institutional actors, other concrete actions can be added, such as the establishment of political schemes and pressure actions coming from agricultural structures (ANADER, Agricultural ministries and animal resources ministries), which can specifically focus on plans for e.g., decrease supply costs on grains or improve logistic infrastructures for shortening value chains and can seek high quality, selected suppliers, and advance towards a more competitive industry.





6. WP ACTION PLAN AND INTERCONNECTIONS

The results of this survey study aim to shed a light on the current context and needs of African rural communities, which regions targeted can be potentially impacted by the technologies to be tested in the regional pilot cases under WP3.

The collection of livestock activities and crop production and consumption habits across the different communities provides an overview of the business activity on the region and its future implication in the adoption of bio-based approaches. This qualitative, comprehensive analysis aims to serve as an additional supportive document for the theoretical system maps and the cost-benefit analysis schemes developed under Task 1.2 and Task 1.4.

Having a first outlook on the type of bio-based approaches being performed at regional level, together with the current capital funding schemes supporting its investment will contribute to the shaping of educational and business materials for conducting workshops and further exploitation initiatives under WP5 and 6.





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8. Appendix

Survey template

Identifying context needs of African rural communities

Directed to: Farm operators/ Agribusinesses / Government and other supporting bodies.

Participant's information sheet

Dear participant,

Thank you for your interest in the BIO4AFRICA research project.

You are invited to participate in this research project, and we are required to provide you with a participant information sheet and consent form to inform you about the study, to convey that participation is voluntary, to explain the potential risks and benefits of participation and to empower you to make an informed decision. You are welcome to ask any questions you may have.

If you have any queries or wish to address questions about your role or rights as a research participant to another person, or if you would like to register a complaint about this study, please contact: Name of institution in charge of distribution and contact point.

Purpose of Research

Africa will need to feed over 2 billion people by 2050 while coping with unprecedented demographic, socioeconomic, environmental, climatic and health transitions. Meanwhile, undernourishment is still on the rise, affecting almost 20% of its population now. Under this light, ensuring Africa's food security becomes imperative, with the bioeconomy posed to play a leading role to this end. It is against this backdrop that BIO4AFRICA sets off to support the deployment of the bioeconomy in rural Africa via the development of bio-based solutions and value chains with a circular approach to drive the cascading use of local resources and diversify the income of farmers. Our focus is on transferring simple, small-scale, and robust bio-based technologies adapted to local biomass, needs and contexts (green biorefinery, pyrolysis, hydrothermal carbonisation, briquetting, pelletising, bio-composites, and bioplastics production). In doing so we aim at empowering farmers to sustainably produce a variety of higher value bio-based products and energy (animal protein feed components, fertiliser, pollutant absorbents, construction materials, packaging, solid fuel for cooking and catalysts for biogas production), significantly improving the environmental, economic, and social performance of their forage agri-food systems. To this end, we have set up 4 pilot cases with over 8 testing sites in Uganda, Ghana, Senegal, and Ivory Coast, offering more than 300 farmers and farmer groups of all sizes (incl. small dairy and lower-income farmers, women farmer groups and transhumant pastoralists among others) the opportunity to test them in real productive conditions. Along the way, our multidisciplinary consortia will engage in solid multi-actor collaboration with rural communities and government, codeveloping novel sustainable value chains driven by circular business models and supporting deployment in





other areas, all while safeguarding agronomic, environmental, social, and economic sustainability. The results of this survey will teach us about the needs, challenges, and context of target farmers and rural communities and how, why and under which circumstances the social, economic, regulatory, institutional, market and political circumstances could act as a barrier or an enabler for the uptake of bio-based solutions.

Privacy and confidentiality

The data for this research will be confidential and your data will be kept anonymised. A record of your questionnaire responses will be stored in a secure location for the duration of the study in case we need to contact you again. Anonymised versions of the questionnaire data may be shared with and analysed by researcher collaborators. They will know the general location of the participant, but no identifying information will be shared. The results the project is likely to be published or presented at professional meetings, but the material used will be always anonymised.

CONSENT FORM

- 1. I confirm that I have read and understood the participation information sheet for th study and have had the opportunity to ask questions.
- 2. I understand that my participation is voluntary, that I am free to not answer specific questions and that I am free to withdraw at any time during the completion of the survey.
- 3. I agree:
 - to volunteer to participate in this research study being conducted for BIO4AFRI by its research partners.
 - to the data being recorded for the purposes of data processing
 - to the collected data being archived and anonymised in a digital repository





1. IDENTIFICATION AND FILTERING.

Section 1A. Identification of the stakeholder profile and country.

- a) For which country are you providing the information?
 - 🗌 Uganda.
 - 🗌 Ghana.
 - □ Ivory Coast.
 - □ Senegal.
- b) How old are you?
 - □ 18-24
 - 🗌 25-39
 - □ 40-54
 - □ 55-64
 - □ 65+
- c) Indicate your gender.
 - □ Male
 - □ Female
 - □ Other
- d) What is the highest level of education that you have completed?
 - \Box No formal education
 - □ Primary
 - □ Secondary
 - □ Undergraduate tertiary degree (Bachelor's degree)
 - □ Postgraduate degree
 - □ Prefer not to say
- e) Which of the following job categories best describe your main employment? If the answer is "Government/Agency Employee" or "Other supporting bodies", please head directly to section 2.

□ Farm Operator (Owner, hired manager, employee)

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- □ Agribusiness professional (business manager, entrepreneur, SME owner)
- □ Government/ Agency Employee.
- □ Other supporting bodies (advisor, associations, business networks, etc)
- Other (Describe): ______

Section 1B. Farmers and business professionals-oriented questions:

- f) You are a farm operator and/or an agribusiness professional. Please indicate the nature of the ownership of the land to which you are related:
 - □ Private (belongs to an individual, company or cooperative).
 - □ Community owned public (belongs to a community: tribe, municipality, state).
 - □ Publicly owned (Government leased farms)
- g) Please indicate the human capital of your organization in number of workers
 - \Box < 10 workers
 - \Box Between 10 and 50 workers
 - \square > 50 workers
 - \Box > 100 workers
- h) Indicate the business activity you cover as an operator within the industry value chain (can select more than one):
 - Farming
 - \Box Processing
 - \Box Aggregation
 - \Box Transportation
 - □ Storage
 - □ Sales & Marketing
 - □ External advisory (consultancy, etc).





i) Indicate the livestock's activities (If applies):

□ Dairy

 \Box Beef

□ Swine

□ Poultry

 \Box Horses

□ Sheep

□ Dairy Goats

Meat Goats

 \Box Rabbits

🗌 Fish

 \Box Aquaponics

Others (Indicate): _____

j) Indicate (tick) the crops being grown in the parcel of land (If applies):

 \Box Corn.

 \Box Soybeans.

 \Box Wheat.

- □ Small Grains (e.g., cassava, sweet potato, ...)
- □ Forage Species / Grass Hay / Pasture.
- \Box Other energy crops, such as Haylage.
- □ Vegetable/ Fruit.
- Others (Indicate): _____
- k) What is the current use of these crops?
 - □ burning (..... What percentage? %).
 - □ burial (.....What percentage? %).
 - \Box Field fodder (..... What percentage? %).
 - □ Litter (..... What percentage? %).

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□ Others (.....What percentage? %).

- I) Which fertilizers do you use on your farm?
 Chemical fertilizers (specify:).
 For which type of exploitation? (Compost, manure, animal droppings...)
 Organic fertilizers (specify:).
 For which type of exploitation? (Compost, manure, animal droppings...)
 For which type of exploitation? (Compost, manure, animal droppings...)
 For which type of exploitation? (Compost, manure, animal droppings...)
 For which type of exploitation? (Compost, manure, animal droppings...)
 I Liquid fertilizers (specify:)
 For which type of exploitation? (Compost, manure, animal droppings...)
 If you use liquid fertilizers, are these organic ?
 Yes D No
 - In terms of profit margin. Open question (Q1): ______ Open question (Q2): ______
- n) Which kind of fuels do you used for cooking?
 □ Wood
 - Charcoal
 - □ Charcoal briquette
 - butane gas

2. Economic needs, challenges, and barriers

Section 2A. non-gender-oriented questions

From 1 identified as the least important and 5 as the most important, how important are these limiting <u>ECONOMIC factors</u> to your professional activity? Please mark with an X and specify when needed in the boxes below when needed.





ECONOMIC BARRIERS AND CHALLENGES FOR YOUR ACTIVITY	Not impor 1	at tant	all	Of low importance 2	Slightly important 3	Moderately important 4	Important 5
Lack of financial Capital							
Lack of credit (e.g., Loans, other financial instruments)							
Lack of supplies (fertilizers, fuels, other key know-how)							
Lack of improved tools and/or equipment							
Low selling prices							
Lack of markets of opportunity (e.g., demand is very local, no opportunities to diversify business/products)							
High cost of labour							
High cost of availability of good agricultural land							
Limited shelf life of harvested products							
Limitations in logistics such as good roads, etc.							

Section 2B. Gender oriented questions

If you are not identified as a woman, head directly to Part 3 of this survey. If you are a <u>woman</u>, answer the following questions.

> Do you think there is a relationship between difficulties in accessing capital and credit and being a woman?

Yes \bigcirc No \bigcirc

	Low	Medium	High
If yes, how strongly do you identify this relationship?	0	0	0





> Do you think there is a relationship between low salaries and being a woman?

) No	0
) No

	Low	Medium	High
If yes, how strongly do you identify this relationship?	0	0	0

> What are some of the mechanisms set up by you/other women that promote access to capital?

Please specify:

3. Social needs, challenges, and barriers

Section 3A. non-gender-oriented questions

From 1 identified as the least important and 5 as the most important, how important are these limiting <u>SOCIAL factors</u> to your professional activity? Please mark with an X and specify when needed in the boxes below when needed.

SOCIAL BARRIERS AND CHALLENGES FOR YOUR ACTIVITY	Not at all important 1	Of low importance 2	Slightly important 3	Moderately important 4	Important 5
Lack of land access					
Lack of collateral					
Healthcare insurance/access					
Lack of educated labour force					

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Lack of access to technical advice/ external services			
Access to agricultural mechanization services			
Social isolation			
Other (please specify)			

Section 2B. Gender oriented questions

If you are not identified as a woman, head directly to Part 4 of this survey. If you are a <u>woman</u>, answer the following questions:

1

N/a dimen

Lliah

> Do you think there is a relationship between difficulties in land access and being a woman?

Yes	Ο	No	Ο

	LOW	weatum	пıgn	
If yes, how strongly do you identify this relationship?	0	0	0	

If yes, how strongly do you identify this relationship?	0	0	0	

> Do you think there is a relationship between accessing loan collateral and being a woman?

Yes	Ο	No	Ο
Yes	Ο	No	Ο

Do you think there is a relationship between difficulties in health care/Insurance access and being a woman?

Yes O No O

	Low	Medium	High
If yes, how strongly do you identify this relationship?	0	0	0

> Do you think there is a relationship between difficulties in employment access and being a woman?





Yes O No O

	Low	Medium	High
If yes, how strongly do you identify this relationship?	0	0	0

> Do you think there is a relationship between social isolation and being a woman?

Yes O No O

	Low	Medium	High
If yes, how strongly do you identify this relationship?	0	Ο	0

> Do you think there is a relationship between the occupation in employment and being a woman?

Yes \bigcirc No \bigcirc

	Low	Medium	High
If yes, how strongly do you identify this relationship?	0	0	0

4. Institutional and governmental/political needs, challenges, and barriers

Section 4A. non-gender-oriented questions

From 1 identified as the least important and 5 as the most important, how important are these limiting <u>INSTITUTIONAL AND GOVERNMENTAL factors</u> to your professional activity? Please mark with an X and specify when needed in the boxes below when needed.

	Not	at	all	Of	low	Slightly	Moderately	
GOVERNMENTAL AND	impo	rtant		importance	e	important	important	Important
INSTITUTIONAL BARRIERS AND CHALLENGES FOR YOUR ACTIVITY	1			2		3	4	5





Lack of direct government subsidies (Cash, Vouchers towards the purchase of agricultural inputs, Interest-free loans, among others).			
Lack of indirect government subsidies (Tax breaks, fuel, seeds, fertilizers, among others).			
Lack of government information systems and communication channels.			
Trust in government			
Education and training access			
Presence or absence of regulations, standards (for approval and marketing of bio-based products)			
Level of Awareness among policymakers regarding use of bio- based solutions (technologies and techniques/processes to produce goods coming from renewable biogenic material (also called "biomass")			
Other (please specify)			

Section 4B. Gender oriented questions

If you are not identified as a woman, head directly to Part 5 of this survey. If you are a <u>woman</u>, answer the following questions:





> Do you think there is a relationship between difficulties in accessing to direct and indirect government subsidies and being a woman?

Yes O No O

	Low	Medium	High	
If yes, how strongly do you identify this relationship?	0	0	0	

> Do you think there is a relationship between difficulties in accessing to government information systems and communication channels and being a woman?

Yes O No O

	Low	Medium	High	
If yes, how strongly do you identify this relationship?	0	0	Ο	

> Do you think there is a relationship between difficulties in accessing to education and training and being a woman?

Yes O No O

	Low	Medium	High
If yes, how strongly do you identify this relationship?	0	0	0

5. Physical and environmental needs, challenges, and barriers

Section 5A. non-gender-oriented questions

From 1 identified as the least important and 5 as the most important, how important are these limiting <u>PHYSICAL AND ENVIRONMENTAL factors</u> to your professional activity? Please mark with an X and specify when needed in the boxes below when needed.

	1	2	3	4	5
Transport.	0	0	0	0	0
Communication.	0	0	0	0	0
Temperature.	Ο	0	0	0	0




Droughts.	0	0	0	0	0
Floods.	0	0	0	0	0
Water supply.	0	0	0	0	0
Poor soil fertility.	0	0	0	0	0
Pests and diseases.	0	0	0	0	0
Logistics constraints	0	0	0	0	0

Section 5B. Gender oriented questions

If you are not identified as a woman, head directly to Part 6 of this survey. If you are a <u>woman</u>, answer the following questions:

Do you think there is a relationship between difficulties in accessing to transport and being a woman?

Yes \bigcirc No \bigcirc

	Low	Medium	High
If yes, how strongly do you identify this relationship?	0	Ο	0

Do you think there is a relationship between difficulties in accessing to communications and being a woman?

Yes O No O

	Low	Medium	High
If yes, how strongly do you identify this relationship?	0	Ο	0

6. Bio-based economy and solutions uptake barriers or enablers

PARTICIPANTS ARE PRESENTED THE DEFINITION OF BIO-BASED SOLUTIONS/APPROACHES:

<u>Bio-based solutions refer to the development of any technologies, techniques and/or processes</u> <u>accelerating a more sustainable agriculture (e.g., producing goods from renewable biogenic material</u> <u>such as biomass, or other sources).</u>





a) Do some of the processes, activities, and products in your organization include a bio-based economy process or technique?

Yes \bigcirc No \bigcirc

- b) If yes, please select where these <u>bio-based practices</u> lie in within your activity:
 - \Box Employment of food ingredients such as biofuels, feed components, biofertilizers, ...
 - □ Anaerobic digestion
 - □ Materials such as Bio-composites/ Bioplastics.
 - □ Pyrolysis
 - □ Torrefaction
 - □ Fermentation to e.g., enzymes, starter cultures, ethanol, lactic acid, food components,
 - □ Hydrothermal carbonization (HTC).
 - □ Briquetting.
 - \Box Green biorefinery to e.g. food or feed components and sugars, .
 - □ Pelletizing.
 - □ Others, please specify: ______.
- c) If you answered not, would you consider including bio-based solutions (e.g., sustainable materials/sources, inclusion of technologies which accelerate a more sustainable activity) in your field of activity?

Yes \bigcirc No \bigcirc

d) From 1 identified as the least important and 5 as the most important, what do you consider are the main barriers for the adoption of more bio-based, sustainable approaches?

	1	2	3	4	5
Lack of knowledge on the subject.	0	0	0	0	0

BIOGAFRIC	Α
BIOGAFRIC	Α



Capital cost for adoption of new approaches is considered very expensive.	0	0	0	0	0
Uncertainty around environmental benefits.	0	0	0	0	0
Insufficient customer demand.	0	0	0	Ο	0
Restrictive laws/rules on the use of bio-based approaches/ more sustainable practices	0	0	0	0	0
High cost of accessing the equipment to accelerate the adoption of bio-based approaches	0	0	0	0	0
High taxes on products coming from renewable biogenic materials/sources	0	0	0	0	0
Challenges communicating the environmental benefits to the customer or stakeholders.	0	0	0	0	0
Feedstock or ingredient supply uncertainties.	0	0	0	0	0
Uncertainty around functional performance.	0	0	0	0	0
Incompatibility with existing processes.	0	0	0	0	0
Regulatory challenges in placing the product on the market.	0	0	0	0	0
Lack of IP framework to protect patent rights in case of discovery of a bio-based innovation					
Other, please specify:	0	0	0	Ο	Ο

e) From 1 identified as the least important and 5 as the most important, please identify your <u>specific</u> <u>needs and expectations</u> when it comes to choosing an alternative bio-based economy solution or approach within the field of your activity:

	1	2	3	4	5
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Higher income	0	0	0	0	0
Local resources valorisation (food supply, feed supply, energy supply for cooking/transportation)	0	0	0	0	0
Superior functional performance in process or final product.	0	0	0	0	0
More competitive price	0	0	0	0	0
Compatibility with existing processes.	0	0	0	0	0
Superior Environmental Performance.	0	0	0	0	0
Other, please specify:	0	0	0	0	0

7. Decision-making processes

<u>Both Men and Women respond</u>. Questions about perceptions of <u>gender discrimination</u> (or equality) regarding women's participation in decision-making processes.

Answer the following questions:

- a) Who makes decisions in the internal organizational structure most of the time? What is the nature of these decisions? (e.g., how income is spent, when to take loans, type of ingredients/products to produce, etc.).
- b) What is the approximate age of the key decision makers?
- c) How many years of working experience they have?
- d) Who is always obliged to follow decisions when they are already made?

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e) How often are decision by Male household member accepted?

f) How often are decision by Female household member accepted?

g) Is there evidence that certain decisions were taken through participation by both men and women? Why, if not, is it felt that men's or women's views are given more importance?





Sources used for the development of the questionnaire:

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Senegal survey report



through circular, sustainable and models

SEP-210673613 / BIO4AFRICA

Objet : Enquête visant à identifier les besoins contextuels des communautés rurales africaines

Destiné à : Exploitants agricoles / Agribusiness / Gouvernement et autres organismes de soutien

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Introduction

Du lundi 06 septembre au jeudi 09 Septembre 2021 nous avons effectué une mission d'enquêtes dans la région de Ziguinchor visant à identifier les besoins contextuels des communautés rurales de la région. L'enquête s'est faite dans quatre zones que sont Diouloulou, Bignona, Ziguinchor et Enampore. L'enquête a été plutôt orientée vers les exploitants agricoles, les éleveurs et surtout ceux qui font de l'agribusiness.

La mission a été rendue possible grâce aux fonds alloués au projet **BIO4AFRICA** et pourrait intéresser à la fois l'Etat et les organismes de développement pour l'émergence de notre chère Casamance longtemps secouée par la guerre.

1. Objectifs de la mission

La mission consiste à recueillir des données auprès de 30 exploitants agricoles et éleveurs dans les zones citées précédemment. Elle repose sur une collecte de données concernant les cultures pratiquées, l'élevage et les facteurs limitants leurs activités professionnelles.

La question du genre ainsi que les processus, activités et produits incluant une technique de l'économie biologique sont une partie intégrante de cette enquête.

2. Description détaillée des communes d'enquêtes

Coubalan commune

Coubalan est une commune de la région de Ziguinchor se trouvant dans le département de Bignona. La Commune de Coubalan compte 17 600 habitants répartis dans 13 villages sur une superficie de 216,06 km². Coubalan est limitée à l'Est par la commune de Ouonck, à l'Ouest par la commune de Niamone, au Nord par la commune de Tenghory et au Sud par le fleuve Casamance. La population est en majorité constituée de Dialo.

L'économie de la commune de Coubalan repose principalement sur le secteur primaire (agricole) dominé par la culture de l'arachide, la riziculture, l'élevage et l'exploitation des produits forestiers et agroforestiers (voir *figure 1*). Les autres secteurs comme le commerce et les services sont relativement importants et, sont pour une large part, tributaires du secteur primaire qui représente en moyenne plus de 85% des activités économiques.





Au plan économique, Coubalan travaille à développer les chaines de valeurs de produits tels que l'anacarde, la mangue, l'huile de palme et impulser le développement à travers la promotion et le soutien aux énergies renouvelables.



Figure 1 : Commune de Coubalan

* Commune de Niamone

Tout comme Coubalan, Niamone est une commune du département de Bignona. La commune de Niamone est limitée à l'Est par la commune de Coubalan, à l'Ouest par les communes de Balingore et Mangagoulak, au Nord par les communes de Tenghory et de Bignona et au Sud par le fleuve Casamance. Avec une population estimée à 18 351 en 2015, la commune de Niamone compte 11 villages répartis sur une superficie de 268 km². La population est en majorité constituée de Baïnouck.

Les principales activités sont l'agriculture (riz, mil, sorgho, arachide, maïs, sésame...), l'élevage (bovins, ovins, caprins, volaille, ...). La pêche et le commerce sont peu développés dans cette commune. La *figure 2* illustre des images sur le type d'élevage développé dans cette commune, plus précisément à Tobor.



Figure 2 : Commune de Niamone





Commune de Ouonck

Ouonck est une autre commune du département de Bignona limitée à l'Est par le fleuve Soungrougrou, à l'Ouest par les communes de Coubalan et Tenghory, au Nord par la commune de Sindian et au Sud par la commune de Coubalan. La Commune de Ouonck compte 12 018 habitants répartis dans 24 villages sur une superficie de 287 km². La population est en majorité constituée de Diola.

La commune de Ouonck est traversée par une piste de production en latérite formant une boucle d'environ 50 km désignée sous le vocable de « Boucle des Kalounayes ». Cette piste, normalement praticable en toute saison et en dépit de son état de dégradation surtout durant la saison des pluies, est la principale voie d'accès de la commune.

L'agriculture, à travers les grandes cultures d'hivernage et le maraîchage constitue la principale activité économique de la commune. Elle occupe tous les ménages. Les principales spéculations sont le riz, l'arachide, le mil, le maïs, le sorgho, la patate, le manioc, le niébé, les agrumes, les mangues, le tarot, etc. Les produits maraichers cultivés sont l'oignon, la tomate, le piment, les aubergines, le gombo, le chou, etc. La pastèque est introduite suite à la diminution des pluies.

Commune de Diouloulou

La commune de Diouloulou est située dans la partie Nord-Ouest du département de Bignona. Elle est ceinturée par la Commune de Kataba 1 et est limitée ainsi, au Nord par le village de Koba Séléty, au Sud par le village de Kataba 1, à l'Est par le village de Bani Israël et à l'Ouest par le village de Koubanack. La commune couvre une superficie totale de 52,8 km² avec une population estimée en 2013 à 5 920 habitants, répartie dans 09 quartiers. La population est en majorité constituée de Diola.

La position de la commune de Diouloulou sur l'embranchement de la route nationale 5 et de la départementale 205 fait de la commune de Diouloulou une ville carrefour vers Bignona, Kafountine et la Gambie.

L'agriculture pratiquée dans la Commune de Diouloulou est de type extensif. Elle constitue la principale activité de la Commune et assure l'essentiel des produits de consommation. Les spéculations agricoles reposent sur les cultures céréalières : le mil, le riz, le sorgho et le maïs, et pour les cultures de rente sur l'arachide et le niébé. Sur le plan maraîcher, les principales spéculations sont constituées de tomates, carottes, oignons, aubergines amer et douce etc. Mais le maraichage pâtit de l'insuffisance d'équipements et du problème de maîtrise d'eau.





L'arboriculture est très développée et constitue une alternative à la diminution des surfaces agricoles. Elle est pratiquée par divers acteurs notamment dans les filières anacarde, mangue, agrumes (mandarine, pamplemousse, citron, oranges etc.), banane etc.

L'intégration élevage - agriculture est réelle et se fait sentir autant dans l'utilisation du fumier comme fertilisant dans l'agriculture que dans l'utilisation des résidus de récolte pour l'alimentation du bétail. De nos jours, pour une augmentation de la production, la traction bovine est mise en œuvre afin d'alléger les travaux champêtres, au niveau de la Commune. La *figure 3* indique les images d'activités agricoles dans la commune de Diouloulou.



Figure 3 : Commune de Diouloulou

Commune de Kataba 1

La commune de Kataba 1 est située dans le département de Bignona. Elle est limitée à l'Est par les communes de Djignaky et Djibidione, à l'Ouest par l'océan atlantique et la Gambie, au Nord par la Gambie et Sud par les communes de Kafountine et Djignaky. La commune couvre une superficie totale de 714 km² avec une population estimée en 2013 à 23 480 habitants, répartie dans 35 villages. La population est en majorité constituée de Diola.

La Commune de Kataba 1 se caractérise par des conditions écologiques et pluviométriques propices à l'agriculture. Ce climat favorable offre à la Commune la possibilité de diversification des activités agricoles (agriculture pluviale, riziculture, arboriculture, maraîchage). Plus de 90% de la population pratique l'agriculture. On note que le riz constitue la principale spéculation même si la culture d'arachide reste intense et malgré la croissance de l'arboriculture. Les tubercules (manioc et patate) et les légumineuses (courges, pastèques, haricots) sont fortement produits.





L'arboriculture apparaît aujourd'hui comme une solution alternative à l'amenuisement des terres pour la culture du riz. Les principales spéculations sont le manguier, l'oranger, l'anacardier, le mandarinier etc.

L'élevage est également pratiqué mais son exploitation revêt un caractère beaucoup plus social qu'économique. Les rares ventes ne sont envisagées qu'en cas de besoins sociaux urgents, et les abattages ont souvent lieu lors des cérémonies traditionnelles (circoncisions, mariages, funérailles) etc. Sur la figure 4, on peut visualiser les champs agricoles dans la commune de Kataba 1.



Figure 4 : Commune de Kataba 1

La *figure 5* illustre la carte de la région de Ziguinchor avec les différentes zones d'enquêtes (encerclées en rouge). Sur cette carte, la commune de Kataba 1 n'apparait pas.









***** Commune d'Enampore

Enampore est une commune du département de Ziguinchor limitée à l'Est par la commune de Niaguis, à l'Ouest par le marigot de Djiromaïthe au Nord par le fleuve Casamance et au Sud par un affluent du fleuve Casamance qui le sépare de la commune de Nyassia. La commune d'Enampore s'étend sur une superficie de 183 km² avec une population estimée à 13 895 habitants en 2015, répartie sur 12 villages. La population est majoritairement composée de Diola.

Les principales activités sont l'agriculture (riz, mil, maïs, sorgho, patate, manioc, arachide,...) l'élevage et la pêche. La culture dominante est le riz. Il s'agit essentiellement de cultures sous pluie, pratiquées dans les bas-fonds. L'élevage dans la communauté rurale constitue une activité complémentaire à l'agriculture. Il joue un rôle important dans l'économie mais souffre de ses pratiques traditionnelles et de son caractère extensif. La *figure 6* indique type d'élevage pratiqué dans la commune d'Enampore.



Figure 6 : Commune de Énampore

* Commune de Ziguinchor

La Commune de Ziguinchor, capitale de la région du même nom, se trouve sur la rive gauche du fleuve Casamance à 65 km de son embouchure sur l'Océan Atlantique et à 15 km de la frontière avec la Guinée Bissau. Elle s'étend sur une superficie de 4 533 hectares avec une population estimée à 239





698 habitants en 2018, répartie dans 35 quartiers. La commune de Ziguinchor est limitée au nord par la commune de Niamone, à l'Est, à l'Ouest et au Sud par la commune de Niaguis.

La région de Ziguinchor présente une illustration significative d'une configuration urbaine plurilingue ; le peuplement est très diversifié; on recense une cinquantaine de langues et dialectes présents en ville : Diolas, Mandingues, Mancagnes et les Mandjak, balantes, Créoles, Wolof, Sérer, Peul et Toucouleur, ...

L'agriculture dans la commune de Ziguinchor est une activité plus ou moins importante pour les populations. Elle est pratiquée dans tous les quartiers périphériques de la commune, mais reste tributaire de la pluviométrie. Elle est dominée par la riziculture et le maraichage. D'autres spéculations comme l'arachide et le maïs sont aussi cultivés. L'élevage est très peu développé et ne connait pas une évolution importante. Il concerne le petit bétail (porcins, caprins et ovins) et la volaille. L'alimentation du bétail repose sur l'exploitation des parcours naturels et, en complément d'aliments, l'utilisation des résidus agricoles laissés dans les champs après les récoltes. La ville de Ziguinchor dispose de potentialités réelles dans la pêche fluviale et lagunaire du fait de la présence du fleuve Casamance.

3. Déroulement et échantillonnage de l'enquête

L'enquête s'est étalée sur quatre jours. Le premier jour d'enquête concernait la zone de Diouloulou. Il s'en est suivi la zone d'Enampore, puis celle de Bignona et enfin celle de Ziguinchor. La figure 7 illustre l'échantillonnage de l'enquête.







Figure 7 : Echantillonnage de l'enquête

Dans la zone de Diouloulou, 15 personnes ont été enquêtées dont 11 dans la commune de Kataba et 4 dans la commune de Diouloulou. Dans chacune des zones d'Enampore et de Ziguinchor, 4 personnes sont enquêtées et ces dernières habitent dans les communes d'Enampore et de Ziguinchor. Pour la zone de Bignona, 7 personnes ont été enquêtées dont 2 habite dans chacune des communes de Coubalan et de Niamone et 3 sont de la commune de Ouonck. La figure 8 illustre les villages dans lesquels habitent ces personnes enquêtées.



Figure 8 : Ensemble des villages d'enquêtes

4. Difficultés rencontrées

Nous n'avons pas ressenti beaucoup de difficultés. Néanmoins elles sont présentes. La difficulté majeure est liée au problème d'accessibilité de la commune de Ouonck dû à l'état de dégradation de la piste. L'accès par voiture n'est pas du tout facile surtout durant cette période hivernale. L'autre problème est lié à la partie **revenue** du questionnaire où les enquêtés sont réticents à donner des réponses concernant le montant gagné par tête d'animal ou par hectare de terre. La dernière difficulté à évoquer est le problème de communication téléphonique à cause de l'instabilité du réseau dans certains villages.

5. Solutions trouvées, proposées





Pour faire l'enquête dans la zone de Bignona, le montant destiné au transport a été calculé sur la base du trajet Ziguinchor-Bignona. Comme nous l'avons souligné précédemment, Ouonck est une commune difficile à accéder. Alors, pour s'y rendre, nous étions obligés de prendre des motocycle type Jakarta. Il nous a fallu ainsi mettre le plein d'essence (3 000 Fcfa) et ce montant est de loin diffèrent à ce qui a été prévu sur le Ziguinchor - Bignona.

Conclusion

Lors de notre mission d'enquête sur les besoins contextuels des communautés rurales de la région de Ziguinchor dans le cadre du projet *Bio4africa*, nous avons été accueillis avec beaucoup de gentillesse, et les enquêtés ont répondu favorablement à notre appel. On tient à exprimer toute notre gratitude à tous ceux qui nous ont facilité la tâche et à tous les enquêtés pour leur bonne collaboration.

Nous rappelons que les listes des enquêtées et la facilitation de l'accueil et des déplacements sur les différentes zones ont été possibles grâce aux partenaires **ASAPID** à Diouloulou, **COUNTRY FARM** à Djibonker et **SCPL** et la chambre de commerce de Ziguinchor pour Ziguinchor.



Quelques images complémentaires de l'enquête

D1.1: Contexts and needs of African rural communities, 30/11/2021













Côte d'Ivoire survey report

COMPTE RENDU DE :	PARTICIPANTS	OBJET DE LA MISSION
MISSION	INPHB M. BAKAYOKO Yacouba Mlle. N'GORAN Adjoua J. Déborah	Enquête visant à identifier les besoins contextuels des communautés rurales Africaines
DU : 21/09/2021 AU : 25/09/2021	<u>Rédacteur</u> : BAK	AYOKO Yacouba

Résumé





La présente mission effectuée dans la zone de Bouaké s'inscrit dans le cadre du projet BIO4AFRICA piloté par l'Institut National Polytechnique Houphouët Boigny (INPHB). Elle avait pour but d'identifier les besoins contextuels des communautés rurales Africaines en vue de donner aux agriculteurs les moyens de produire durablement une variété de produits biosourcés et d'énergie à plus forte valeur ajoutée (composants d'aliments protéiques pour animaux, engrains absorbants de polluants, matériaux de construction, emballages, combustibles solides pour la cuisson et catalyseurs pour la production de biogaz). Pour mener à bien notre mission, l'autorisation du corps préfectorale a été sollicité et obtenue. Ainsi, des membres d'associations, groupements ou coopératives ont été visités. Au terme de la mission 15 exploitants agricoles (Eleveurs et Agriculteurs) ont pu être auditionné. Pour atteindre nos cibles, la méthodologie d'échantillonnage utilisée a été la suivante :

La zone de Bouaké a été subdivisée en 4 zones agro-écologique et en fonction des différents entrées et sorties de la ville puis dans un rayon de 20 Km.

Pour l'association des éleveurs, les difficultés et besoins de manière générale ont été évoqués. Il s'agit du manque d'intérêt pour la filière bétail de la part de l'Etat. L'hostilité des propriétaires des terres pour l'aménagement des pâturages, l'incompétence des autorités dans la résolution des conflits entre populations et éleveurs. Egalement, le manque de structure vétérinaire dévoué pour le suivie sanitaire du bétail, ce qui a permis la prolifération de plusieurs maladies qui minent la filière. Ajouter à cela, les tracasseries routières pour l'approvisionnement des marchés.







Au parc à bétail à la rencontre des présidents de l'association des

Dans les différents villages visités à la rencontre des éleveurs, nous avons été bien reçus. Nous nous sommes ensuite rendus dans les parcs pour constater la présence effective des animaux selon le type d'élevage pratiqué. Ainsi, nous avons pu rencontrer des éleveurs de bovins, ovins et de volailles.













Les producteurs nous avons bien reçu et ont manifesté leur enthousiasme quand a l'arrivé de telles initiative. De manière générale, les agriculteurs ont révélé des difficultés telles que la fluctuation du coût des produits agricoles notamment de l'anacarde, le soja, le maïs, l'igname et le manioc. Les responsables d'associations et coopératives rencontrés ont également révélé l'indisponibilité de semences de qualité, le manque de suivi régulier par les structures d'encadrements, les dégâts causés par la transhumance des bœufs. Ils ont aussi évoqué leur attente quant à l'appuis des décideurs pour l'amélioration de leur condition de travail en termes de matériels et d'équipements.



D1.1: Contexts and needs of African rural communities, 30/11/2021









D1.1: Contexts and needs of African rural communities, 30/11/2021





Analyse et suggestions

La mission s'est déroulée dans différentes localités en zone périurbain de Bouaké sans ambages et dans une bonne ambiance participative. Les éleveurs et agriculteurs ont démontré par leur promptitude et leur engouement lors de nos entretiens, l'intérêt qu'ils accordent à notre initiative. Ils ont également montré une bonne disposition au travail collaboratif.

A la suite des entretiens, il est ressorti des suggestions :

- Responsabiliser des nationaux pour une bonne gestion de la filières bétail.
- Dynamiser le domaine des vétérinaires pour une prise en charge efficace des maladies des bétails et garantir ainsi la santé les consommateurs.
- Suivre les paysans dans l'application de différentes techniques mise à leur disposition.
- Les paysans ont émis des demandes de Gans en plastiques, de bottes, de bâches pour la conservation du soja récolté.

RAPPORT DE MISSION

Enquête visant à identifier les besoins contextuels des communautés rurales africaines

Destiné à : Exploitants agricoles / Agribusiness / Gouvernement et autres organismes de soutien.

Dans le cadre de l'enquête visant à identifier les besoins contextuels des communautés rurales africaines, une mission de terrain s'est déroulée du 21 au 25 septembre 2021 dans le département d'Agnibilékrou.

Au cours de cette mission, l'équipe d'enquêteur que j'ai dirigée, avec l'assistance des représentants locaux de l'ANADER (Agence National d'Appui au Développement Rural) a visité quatre souspréfectures. Il s'agit des sous-préfectures d'Agnibilékrou, de Damé, de Tanguelan et d'Akoboissué. Au total, 18 exploitants agricoles ont été interrogés dans l'ensemble de ces quatre sous-préfectures, soit 3 à Agnibilékrou, 5 à Damé, 6 à Tanguelan et 4 à Akoboissué. Toutes les interviews ont été effectués avec les propriétaires d'exploitation ou un employé. La répartition par genre des exploitants agricoles interrogés révèle une proportion de 5,5 % de femme contre 84,5 % d'homme. Selon le type d'exploitation agricole, les producteurs enquêtés comptaient trois (3) producteurs de vivriers, sept (7) éleveurs et huit (8) producteurs de cultures d'exportation. Uniquement, 11,11 % d'exploitants travaillent sur des terres communautaires. La proportion d'exploitants agricoles ayant adopté des





produits biosourcés représentait 11,11 % des exploitants interrogés. Les besoins indexés pour le formulaire d'enquête ont été identifiés comme important par la grande majorité des exploitants. Également, les propositions du formulaire pouvant militer à l'adoption des produits biosourcés ont été trouvées importantes et motivantes.

Tous les producteurs ont accueilli cette enquête avec beaucoup d'enthousiasme, tout en émettant des craintes quant au retour escompté. Cette inquiétude a été levée après les explications fournies par l'équipe d'enquêteur.

Equipe d'enquête :

- M. EHUI Kouadio Jean Nestor (Enquêteur)
- M. ADOU (agent local Anader Tanguelan)
- M. KOUAME (agent local Anader Agnibilékrou commune)
- Mlle. YOMAN Victoire (agent local Anader Damé)



Photo 1 : Exploitant agricole produisant du Persil à Damé







Photo 2 : Exploitant agricole récoltant du Persil à Tanguélan







<u>Photo 3</u>: Ferme d'élevage de poulet et de production de maïs à Tanguélan



Photo 4 : Ferme d'élevage de poulet et de production de maïs à Tanguélan







Photo 5 : Ferme d'élevage de poulet Assikasso







Photo 6: Exploitation agricole cacaoyer à N'guessankro

Rapport d'enquête BIO4Africa dans le département d'Anyama-Azaguié

Enquêteur : M. Yaya Anianhou OUATTARA

L'objectif de l'enquête vise à obtenir des informations plus approfondies sur les principales caractéristiques des systèmes agroalimentaires et fourragers locaux, tout en mettant en évidence leur dynamique et en révélant des pistes pour introduire durablement des chaînes de valeur biosourcées.

Pour mener à bien cette enquête nous somme rendu à l'ANADER-ABOBO (Agence Nationale d'appui au Développement Rural) pour prendre des informations dans le domaine de l'agriculture et de l'élevage dans le département d'Anyama-Azaguié.

Au cours cette mission 15 exploitants agricoles ont été enquêtés dans le département d'Anyama-Azaguié. Soit 12 à Anyama et 3 à Azaguié. La répartition par genre des exploitants agricoles interrogés révèle une proportion de 13,33 % de femme contre 86,66% d'homme. La proportion d'exploitants agricoles ayant adopté des produits biosourcés représentait 73,33 % des exploitants





interrogés. Les exploitants agricoles interrogés ont souligné à 100 % l'absence de soutien matériel et financier. Le niveau d'éducation ont révélé que 46,66 % n'ont pas d'éducation formelle, que 20% ont un niveau primaire, que 26,66% ont un niveau secondaire, que 6,66 ont un niveau de troisième cycle.

Comme difficultés rencontrées sur le terrain, certains exploitants étaient difficiles à joindre. La barrière de la langue nous empêche d'échanger efficacement.

Les besoins indexés pour le formulaire d'enquête ont été identifiés comme important par la grande majorité des exploitants. Les producteurs espèrent un retour favorable à leur procuration, car cela pourrait réduire les pertes de production et améliorer leur revenue.



<u>Photo 7</u>: Ferme d'élevage de Bœuf à Tanguélan







Photo 8 : Ferme piscicole à Akoboissué







Photo 9 : Ferme piscicole

RAPPORT DE MISSION DE KORHOGO

Dans le cadre de l'enquête de BIO4AFRICA qui s'est déroulé du 21 au 25 septembre 2021 dans plusieurs villes de la Côte d'Ivoire, dans la ville de Korhogo il a été aussi réalisé une enquête. Le contexte de l'enquête était de soutenir le déploiement de la bioéconomie dans les zones rurales d'Afrique par le développement de solutions et de chaines de valeurs biosourcées, avec une approche circulaire pour favoriser l'utilisation en cascade des ressources locales et diversifier les revenus des agriculteurs.

Pour bien mener notre enquête, nous avons divisé la zone nord en quatre sous zones (Nord, Sud, Est et Ouest) avec pour point focale la ville de Korhogo. Et dans chaque zone, nous avons enquêter au minimum quatre (4) personnes. Au total, 19 personnes ont été enquêtées (agriculteurs et éleveurs).

Durant l'enquête, nous avions connus d'énormes difficultés auxquels nous pouvons citer :

- Le manque de soutien de la part des structures (ANADER, Ministère de l'Agriculture, Ministère de la Production Animale.)
- La réticence de certains acteurs rencontrés durant l'enquête
- Les routes très impraticables pour relier les zones enquêtées...

Néanmoins dans l'ensemble, l'enquête s'est bien déroulée car elle nous a permis de connaître les problèmes des acteurs du monde rural. Ces acteurs attendent les retombées du projet car pour eux, plusieurs projets sont passés et la suite n'a pas été concluante en termes d'aides qui leur ont été promis.

Aux sorties de tout ce qui précède, souhaiterons que cette enquête ait un impact positif sur les acteurs du monde rural et ce projet puisse aboutir à l'aide de ces acteurs.

RAPPORT DE MISSION DE YAMOUSSOUKRO

Dans le cadre de l'enquête de la structure Bio4africa qui s'est déroulé du Mercredi 22 Septembre au samedi 25 Septembre 2021, j'ai eu à sillonner la ville de Yamoussoukro. Le but de l'enquête était d'identifier les besoins contextuels des communautés rurales africaines. Le contexte de l'enquête était de soutenir le déploiement de la bioéconomie dans les zones rurales d'Afrique par le développement de solutions et de chaines de valeurs biosourcées, avec une approche circulaire pour favoriser l'utilisation des ressources locales et diversifier les revenus des agriculteurs.

Pour mener à bien cette enquête, nous avons eu à diviser la zone de Yamoussoukro en quatre parties : une zone nord, une zone sud, une zone est et une zone ouest. Avant de commencer l'enquête, nous sommes rentrés en contact avec le ministère de l'agriculture et le ministère des ressources animales et halieutiques de Yamoussoukro pour avoir une idée de l'agriculture et de l'élevage au sein de cette région. A la suite de

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cela nous sommes allés dans chaque zone où nous avons eu a enquêté au minimum 4 personnes composés d'agriculteurs et d'éleveurs. J'ai pu obtenir un total de 20 personnes dans la zone de Yamoussoukro.

Durant cette enquête, les agriculteurs et éleveurs nous ont fait part de plusieurs difficultés auxquels ils sont confrontés telles que :

- Le manque de soutien des structures agricoles (ANADER, ministère de l'agriculture et le ministère des ressources animales) ;
- Le coût élevé des engrais ;
- Les routes impraticables pour acheminer leur récolte...

Nous pouvons retenir dans l'ensemble que la mission s'est bien passée et elle a nous permis d'avoir des informations sur certaines cultures et aussi connaitre les problèmes des agriculteurs et éleveurs. Nous aimerions que cette enquête puisse réellement apporter des changements au niveau de l'agriculture et de l'élevage car les exploitants agricoles en ont besoin.

RAPPORT DE MISSION MAN

Le présent rapport fait suite à l'enquête initié par le projet BIO4AFRICA, visant à identifier les besoins contextuels des communautés rurales africaines, en vue de donner aux acteurs du monde rural les moyens de produire durablement une variété de produits biosourcés et d'énergie à plus forte valeur ajoutée (composants d'aliments protéiques pour animaux, engrais absorbants de polluants, matériaux de construction, emballages, combustibles solides pour la cuisson et catalyseurs pour la production de biogaz).

C'est dans ce contexte qu'une mission de terrain s'est déroulée du 21 au 25 septembre 2021 dans le département de Man.

Au cours de cette mission, approuvée par la sous-préfecture du département de Man, l'assistance des représentants locaux de l'ANADER (Agence National d'Appui au Développement Rural) a été d'un grand soutien pour localiser les grandes zones de production agricole du département de Man.

Ainsi, le département a été divisée en quatre sous zones avec pour point focal la ville de Man dans un rayon de 20 Km. Au total, 20 personnes ont été enquêtées, propriétaires d'exploitation (agriculteurs et éleveurs), employés ou producteurs d'aliments :





- Sept personnes dans le nord dans les villages de Geupleu, Gbatongouin, Gouélé, Kiélé plus la ville de Biankouma
- Quatre personnes dans le Sud dans les villages de Zélé, Sadiapleu et Bogouiné
- Cinq personnes dans l'Est dans les villages de Dompleu, Kesabli, Dainé et Késon
- Quatre personnes dans l'Ouest dans les villages de Kassiapleu et Sangouiné

Dans l'ensemble, autant les femmes que les hommes sont intéressés par l'activité agricole avec une préférence pour les cultures vivrières, maraichères, l'élevage de porcs et de volailles pour les femmes ; et les cultures industrielles et l'élevage de bovins est dominés par les hommes. Néanmoins, pour chaque type d'activités, autant les hommes aident leurs femmes au défrichage des parcelles par exemple, les femmes aident leur mari pour l'écoulement des produits d'élevages tels que le lait, le fromage...

La motivation de tous pour accroitre leur production est grande, cependant le manque de matériels, surtout d'un motoculteur, est un frein à cette motivation. Pour la plupart, la méconnaissance des produits biosourcés est un fait, cependant leur utilisation ultérieure a été trouvées nécessaires.

Tous les producteurs ont accueilli cette enquête avec beaucoup d'enthousiasme, tout en émettant des craintes quant au retour escompté, du fait de plusieurs promesses non tenues lors d'enquêtes précédentes. La structure d'aide, l'ANADER, espère également beaucoup de cette enquête, pour ne pas être en porte-à-faux avec les producteurs plus tard.

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