

Common Format for Project/Program Concept Note for the Use of Resources from the FIP Competitive Set-Aside

Country/Region:	Burkina Faso	1. CIF Project ID#:	
Project/Program Title:	Climate change mitigation and poverty reduction through the development of the cashew sector in Burkina Faso		
Date of Endorsement of the Investment Plan:	Endorsed (subject to improvements) in June 2011		
Funding Request (in million USD equivalent):	Grant: N/A	Non-Grant (loan): US\$ 4 million	
Implementing MDB(s):	African Development Bank	<input checked="" type="checkbox"/> Private sector arm <input type="checkbox"/> Public sector arm	
Executing Agency:	Wouol (farmers' association)		
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I. PROJECT DESCRIPTION

1. In Burkina Faso, the Wouol Farmers' Association is a national-level union of cooperatives, a type of organization recognized as a private sector entity in Burkinabe legislation¹. Wouol aims to improve the livelihoods of the rural population through sustainable management and valuing of natural and cultural resources. Although Wouol is a non-profit association, it generates margins that are 100% reinvested in the business, to support members' economic development. Wouol operates in 20 communes in the Regions of Cascades, Hauts Bassins, and Sud Ouest, at the boarder of Mali, Ivory Coast, and Ghana.

2. Wouol's membership consists of 69 cooperatives and more than 2,500 farmers, of which 70% are women. Farmers are active in the production, processing, and trading of cashew nuts, mangoes, sheanuts, maize, and vegetables. As a transversal activity, Wouol promotes the protection of the environment and environmental education. In the last years, Wouol achieved the following:

¹ Established by the Uniform Act on the right of cooperatives adopted in December 2010 by the Organization for the Harmonization of Business Law in Africa (OHADA).

- Creation of four mango drying units and five cashew nut processing units. Wouol processes 150 tons of dried mangoes and 210 tons of cashew nuts per year. Assuming a processing rate of 16%, it represents around 1,250 tons of raw cashew nuts per year.
- Development of commercial links with foreign buyers and investors, especially in the Netherlands: in 2012, Wouol received a working capital of \$1.33 million from Triodos Bank; European buyers purchase over 1,000 tons of almonds per year.
- Double certification under organic (EcoCert) and fair trade (Flo) certificates for a major part of their mangoes and cashew plantations: 400 hectares (ha) of a total 525 ha of mangoes, and 1,400 ha of a total 2,075 ha of cashew nuts.

Objectives

3. The objectives of the project are to:

- **Mitigate climate change** through: (i) development of cashew tree plantations that sequester carbon; and (ii) reduction of forest degradation and deforestation in the neighboring forests, by providing economic alternatives to non-sustainable practices (cropping of cotton, soy, groundnut, sesame, overexploitation of NTFP).
- **Restore degraded soils:** cashew trees have the capacity to achieve this in a cost-efficient way, and thus positively affect the climate (0.33 tCO₂e/ha stored in soils) and adaptation capacities (through soils fertility and water quality preservation). It is worth noting that cashew planting was first introduced in Burkina Faso for this purpose, not for the production of cashew nuts.
- **Increase incomes of the rural populations**, particularly women.
- **Showcase the economic profitability and environmental sustainability of certified organic and fair trade agriculture.**

Activities

4. The main activities will consist of three components:

- I. Enhancing cashew production through plantations with selected varieties and improved management practices;
- II. Improving cashew processing capacities;
- III. Strengthening the capacities of the Association and its members, especially in terms of agricultural product trade (higher quality, stronger networks) and agroforestry.

→Component 1: Enhancing cashew production

5. Most of the cashews currently produced come from poorly managed cashew tree plantations or hedges, using non-selected planting material. As a consequence, yields and quality of cashew nuts are usually low. This component includes the following activities:

- Strengthening farmers' and processors' cooperatives (awareness raising, training, legal registration, etc.);

- Revamping the central nursery and establishing two decentralized nurseries for seedling production from improved planting material (455,000 plants to be produced during the project lifetime);
- Developing 5,300 ha of new cashew plantations: 5,050 ha of plantations, 250 of agroforestry plantations (inter-row is between 3 to 5 m for forest plantation and between 7 to 10 m for agroforestry plantations, intercropped with ginger, hibiscus, sesame, beans, peanuts). These new plantation will produce up to 4,320 tons of cashew nuts per year, assuming a yield of 900kg/ha (according to the National Institute for Environment and Agronomic Research (INERA), the yield can even increase up to 1,200 kg/ha. A conservative value is considered here).
- Maintaining the cashew and agroforestry plantations. Additionally, the project will develop agroforestry systems through the promotion of intercropping in the cashew trees plantations (ginger, pineapple, peanut, soy and vegetable crops).

→Component 2: Improving cashew nut processing capacities

6. A key issue in Burkina Faso is to increase the processing rate of agricultural products in the country. Currently, 90% of the raw nuts are processed abroad. In addition to that, the average processing yield is around 16% and the percentage of entire almonds is 55%, which are quite low.

7. Butane is presently the main source of energy to heat the raw nuts and dry the almonds. Driers can use nut shells to dry raw nuts, in place of butane, thus reducing GHG emissions, assuming cashew nut shell liquid is extracted before burning.

This component includes the following activities:

- Increasing the storage capacities (building storage warehouses, store-keeper training, etc.) and thus avoiding losses from insects and other pests;
- Improving the processing capacities, both in terms of processing yield (from 16% to 20%) and volume (from 1,250 tons/year of processed raw nut to 6,050 tons/year), with the purchase of new processing machines and the modernization of existing ones;
- Improving the quality through the use of autoclaves, peeling machines, etc.
- Using raw nut shells for heating raw nuts and drying almonds;
- Setting up a cashew shell pressing unit;
- Training of processing units' staff: entrepreneurial management of processing units, maintenance of equipment and hygiene, classification and sorting of almonds according to international standards, etc.

→Component 3: Strengthening the Association's capacities

8. Part of the cashew nut production is already certified as organic and fair trade. Wouol intends to certify 100% of its products. This component includes the following activities:

- Reinforcing the internal quality management system: hiring one quality manager per processing unit, creating a quality manual to respond to international standards, setting up a laboratory to routinely measure moisture content, impurities, pH,

average weight, etc., creating a database to ensure the traceability throughout the value chain (including social-economic impacts on farmers and processors);

- Getting 100% certified under the organic and fair trade standards;
- Prospecting foreign markets: market studies in the EU, participation to salons in Europe, actively outreaching potential buyers, production of advertising materials.

Project sites (plantations and processing units)

9. The following map presents the location of Wouol activities. Provinces where Wouol works with producers are highlighted in green. Numbers inside circles indicate the processing units (see table hereunder).



Plantations:

10. Existing plantations are located in 20 Communes, in the Provinces of Comoé, Léréba, Kéné Dougou, Poni, and Nubiel. These plantations will be extended and new ones will be created in Communes not yet covered. Three Communes already expressed their interest (Niamologo, Midebdo and Sifarasso) and their selection will be decided during a General Assembly in September.

11. The potential sites for the plantations are either agricultural areas or degraded savannas. To plant on savannas, a land owner has to get the go-ahead of the Water and Forest services (some tree species are protected by the Forest Code).

Processing units:

12. The five processing units are distributed among the existing plantations and new plantations will be created within the same areas. These processing units are the following:

	Location	Name	Processing capacity (tons of raw nuts)
1	Bérégadougou	GTAB	594
2	Orodara	UTAK	297
3	Dakoro	WOLAPIE	297
4	Kampti	UTASO	297
5	Banfora	BOUNOUNA	396
Total			1,881

II. Rationale

13. Cashew trees can play an important role in the national context: generating income, fighting poverty, mitigating climate change, and providing environment protection and restoration to enable both sustainable economic development and adaptation to climate change.

14. The FIP Investment Plan for Burkina Faso states that successful implementation of REDD+ will require strengthening the capacity and interest of local communities for managing forests and agro-forestry assets and allowing them to fully benefit from emerging carbon markets and other funding schemes. In that context, reforestation is identified as a promising activity. The Sud-Ouest region is an area of intervention of both Wouol's activities and the 2 projects developed under the FIP Plan. The communes of Batié and Midebdo will be engaged in the two initiatives and Midebdo has expressed interest in being integrated into Wouol's activities.

15. The project is also in line with national policies. In particular, it is aligned with the liberalization policy: since 1991, Burkina Faso has been engaged in a nationwide program of economic reform aimed at developing a liberalized economy, where the private sector would be the main source of growth. In that respect, the action plan for the oilseeds sector redefines the role of the State and promotes industrial development.

16. At the local level, the cashew production is perfectly adapted to the ecological, social and economic conditions. The areas where Wouol operates are major production areas in Burkina. A report from the African Cashew initiative (iCA, 2010) estimated the cashew development as one of the best way to fight poverty in these areas.

17. Presently, the cashew value chain does not fully benefit the country, because local processing companies have difficulty accessing working capital and investment credits, and the cashew market is dominated by foreign companies, so that a major part of the cashew production is exported as raw nuts. The development of new processing units will address this issue.

III. Consistency with Investment Criteria

Climate change mitigation potential

18. Climate change mitigation will be achieved through:
- storage of carbon in the biomass and in the soils (350,478 teCO₂ for the lifetime of the project, deducting emissions due to fires), and
 - reduction of emissions of the transformation process (21,051teCO₂):
 - o extraction of cashew nut shell liquid, reducing the GHG emissions due to nut shell burning,
 - o drying of almonds by burning nut shells, rather than using butane.
19. When the volume of processed raw nuts increases, the project will generate around 5,000teCO₂ (for transformation and transport, including export).
20. These estimates do not take into account the effect on the protection of existing forests through a switch from activities which are drivers of deforestation and forest degradation (other types of agriculture, overexploitation of NTFP, etc.). Calculations are detailed in **annex I**.

Demonstration potential at scale

21. The cashew sector has a very high development potential. Many improvements achieved through this project will interest other farmers and transformers: use of selected planting materials, intercropping, organic and fair trade certification, replacement of butane, etc. (See Section VII for more detail.)

Cost-effectiveness

22. Available literature allows project developers to estimate the cost of mitigation around \$18/teCO₂ sequestered. This is higher than the average carbon market price (\$5-10/teCO₂), but still can be considered cost-effective in the Soudano-Sahelian context, with low plantation productivity. The carbon revenue alone would probably not justify the development of such projects, but as cashew almond production is a profitable activity, other investors will see carbon revenues as a means to potentially ensure a higher profitability of their investments.

Implementation potential

23. Wouol already benefits from loans which allow it to start the project immediately. Even if training and capacity building are foreseen in the course of the project, the staff already has the required capacities to start the activities.
24. Contacts have already been made to purchase the needed equipment and to sell the products. BioVisio, a firm from the Netherlands, has already expressed willingness to buy at least 1,000 tons of almonds every year, roughly what could be achieved by the project.

Integrating sustainable development (co-benefits)

Ecological impacts

25. According to a study carried out by GIZ in the framework of the African Cashew initiative (iCA, 2010), the cashew tree is considered as a reforestation tree contributing to preserving the environment and improving soil fertility. Cashew was introduced in Burkina Faso during the 1960's to restore soils and fight against desertification. As explained, the development of the cashew sector will also allow protecting forests currently under pressure from activities leading to deforestation and degradation, such as cotton, soy, maize, peanut and other types of agriculture, overexploitation of NTFP.

26. Currently, 1,400 ha of a total of 2,075 ha of cashew plantations supplying Wouol are certified organic (with EcoCert certification) and Wouol would like to get 100% of its plantations certified. Some farmers are already in a transition phase, switching from conventional practices to organic practices.

27. This standard guarantees no chemical input is used in the field or during the processing. The certification also requires implementing soil and water protection activities. Finally, regular training is provided to the staff and members of the Wouol network on environmental quality.

Social impacts

28. iCA (2010) identified cashew nut production as a valuable activity to fight against poverty in certain areas, particularly where production is highest (like Wouol's intervention area). Wouol manages the plantations of more than 300 small farmers and employs 800 staff in its processing units (especially women, who represent 70% of the membership), and benefits are widely shared. These benefits will be further increased if 400 new farmers are involved in the creation of new plantations and 1,200 staff are hired in the new or revamped processing units.

29. In addition to that, the fair-trade certification guarantees minimum prices to farmers, a high level of governance in the cooperatives and regular training for all the members.

30. Improved processing yield will allow increasing value-added in the country, promoting both rural and national development.

31. Finally, pilot activities to promote agroforestry practices and diversification of agricultural production (intercropping of ginger, hibiscus, sesame, beans, and peanuts) should also contribute to improved livelihoods for local populations.

Safeguards

32. **Organic and fair-trade certifications:** Qualifying for these high quality standards based on environment and socio-economic criteria will be important to ensure access to international markets.

33. **REDD+ safeguards:** The project will seek to be compatible with existing programs and conventions, to ensure transparency during the implementation, to respect local knowledge and rights, to promote participation and to conserve natural forests, biodiversity and forest ecosystem co-benefits. Wouol will also apply AfDB's safeguard policies.

34. **Forest code:** Contracts between Wouol and the farmers will refer to the forest code, and replacement of native tree species (shea tree, néré, baobab, etc.) by cashew plantations will be forbidden.

35. **Local development plan and land tenure:** Wouol already collaborates with the Communes to ensure that plantation sites respect the Communal Development Plans and maximize their contribution to local development. As plantations will be developed in line with the CDP, the risk of conflicts will be reduced. In turn, Communes are also committed to help farmers' cooperatives secure land by endorsing minutes of communications between the cooperative, land owners, land users and the Commune on land use. In particular, Wouol, the Communes and the cooperatives are represented within "*Commissions villageoise de conciliation foncière*", which were created by the 2009 Rural Land Bill and aim at promoting local mediation (notably through traditional land chiefs and village chiefs) to address land tenure conflicts. It is therefore expected the project will not encounter any land conflicts.

IV. Type of Private Sector Engagement

36. The project will be solely a private sector project. Wouol will be the beneficiary of the loan and will support both the processing units and the farmers. Farmers' Cooperatives and processing units are part of the Wouol Association but legally independent.

37. However, all these members will contribute to the funding of the project: each processing unit will pay to afforest 25ha (125 ha in total) and each producer will support at least 20% of the plantation costs (in addition to providing the land).

38. Reimbursement will be secured through contracts signed by cooperatives, farmers and Wouol, in which the farmers' cooperatives are held responsible jointly with Wouol for the loans' reimbursement (via a mutual guarantee fund fed by 5% on each sale of raw or processed cashew nuts and, where the mutual guarantee fund is not sufficient, the right to seize farmers' production using the "warrant" system).

39. As an umbrella for the farmers' cooperatives and processing units, Wouol coordinates all the activities (planting, harvesting, storage, processing, marketing, etc.) and has knowledge about each member's reimbursement capacities, which should avoid tapping into the mutual guarantee fund or, even worse, ceasing the production.

V. Innovation

40. **Securing the supply of raw cashew nuts:** unsecure supply of raw nuts is one of the most important barriers to the development of the cashew processing industry. Presently, supply is erratic and depends on the demand of a few foreign buyers. Attempts to secure supply failed for two reasons: (i) the necessary relationship of trust between producers and processors is not strong enough to encourage producers to sign supply contracts, and (ii) processing capacities of processors having strong links with the producers (mainly Wouol) is too weak to absorb the production and develop producer's loyalty. The development of a strong partnership between farmers' cooperatives and processing units is an innovation, which should allow the development of the sector.

41. **Using selected cashew varieties:** the cashew tree was introduced in Burkina Faso during the 60's but the intensive development of commercial cashew plantations is recent (about 10 years). No research program on varieties was conducted and farmers are using un-selected varieties and get poor results both in terms of yield and quality of the nuts. Varieties will be selected in Burkina by the National Institute for Environment and Agronomic Research (INERA). This innovation, alongside an improvement of plantation management practices, should allow increases in yields from 400 kg/ha of raw nuts to more than 1,000 kg/ha (NB: to be conservative, we used the estimate of 900 kg/ha in our calculations).

42. **Improving peeling techniques:** the processing units will be equipped with modern Indian machines (autoclaves and peeling machines), which have proven high performances in this country and are installed in semi-industrial units in Burkina Faso (SOTRIAB, ANATRANS). Combined with improved storage capacities and conditions, this innovation should increase the processing yield from 16% to 20% and the percentage of entire almonds from 55% to above 62%.

43. **Switching from butane to nut shells for the drying:** this innovation was developed by the SNV (Dutch cooperation agency), firstly for the drying of raw nuts. It will be adapted to the drying of almonds and improved with the extraction of the cashew net shell liquid to reduce GHG emissions from burning and to realize the value of this liquid (to the car industry in particular). Presently, 0.5 tons of butane is used to dry 1 ton of almonds. This investment of \$2,013,000 will allow to avoid the emission of roughly 7 400 tCO₂e (28\$/tCO₂) considering current cashew production or 119,700 tCO₂e (\$1.8/tCO₂e) considering the increase of processing due to the project.

44. **Certifying agri-products:** the double certification, organic and fair-trade, should add a real added-value in terms of accessing international markets and increase the sale price for producers (20% of premium, compared to non-certified raw nuts as detailed in section VII).

VI. Business Model

45. The costs will be the following:

Components	Costs in US\$	Percentage
Component 1: Increasing the quantity and improving the quality of raw cashew nuts	3,452,000	53%
Component 2: Enhancing cashew nut processing capacities and performance	2,282,000	35%
Component 3: Marketing improvement	779,000	12%
Total	6,513,000	100%

46. As supply is a limiting factor in the cashew processing activity, the project focuses on plantations that will supply the processing units in the future.

47. Securing existing markets and seeking new opportunities are not neglected and represent, therefore, 12% of the budget.

48. The table hereunder summarizes the contributions:

Components	Wouol's contribution (US\$)	Producers' contribution (US\$)	Grants (Oxfam and BioVisio) (US\$)	Loans (FIP and AfDB) (US\$)
Component 1: Increasing the quantity and improving the quality of raw cashew nuts	195,000	1,794,000	10,000	1,453,000
Component 2: Enhancing cashew nut processing capacities and performance	219,000	0	18,000	2,045,000
Component 3: Marketing improvement	147,000	0	114,000	518,000
Total	561,000	1,794,000	142,000	4,017,000
Percentage	9	28	2	61

49. Farmers contribute significantly to the project through the provision of land (67%), harbor (24%) and cash (9%). The contribution from Wouol will include cash (62%), expertise (28%) and the provision of materials and equipment (10%).

50. Activities have been designed with the objective of increasing the production while decreasing cost per unit of product. The impacts of the investments on these two variables will be the following:

Steps	Traditional practices	Improvements brought by the project
Nursery	No use of selected varieties	Improved methods through training <ul style="list-style-type: none"> → Costs reduction Selection of varieties <ul style="list-style-type: none"> → Contributes to the increase of the yield from 400kg/ha to 900 – 1000kg/ha.
Plantation	Non optimized practices	Improved methods through training <ul style="list-style-type: none"> → Contributes to the increase of the yield from 400kg/ha to 900 – 1000kg/ha. For plantation maintaining, inter-cropping <ul style="list-style-type: none"> → New revenues (estimated around 10% of the production)
Plantation maintaining	Low maintenance by producers	
Harvesting	Non optimized practices	
Raw nuts storage by producers	Losses due to weak storage capacities	
Raw nuts storage before processing	Limited capacities which would make an increase of the processed volumes difficult	Increase of storage capacities <ul style="list-style-type: none"> → Contributes to the increase of volumes processed from 1250 to 6050 tons of raw nuts per year
Nuts heating	Heating with nut shells without extraction of CNSL.	Nut shells treatment (CNSL extraction) <ul style="list-style-type: none"> → Mitigation of climate change and new incomes from balm selling
Nuts opening	Manual	More performing opening machines <ul style="list-style-type: none"> → Contributes to the increase of entire almonds from 50% to 65%, increase the transformation yield from 1/6 to 1/5 and to the increase of the mean price of a kg of almonds by 0,4US\$ (7%).
Almonds drying	Almonds are dried using butane	New dryer <ul style="list-style-type: none"> → Suppression of butane allowing climate change mitigation(7,400tCO₂e to 119,000 tCO₂e, depending if we consider the avoidance of emissions due to the drying of the future production) → Decrease of the production costs (67US\$ per ton of almond)
Peeling	Manual	Peeling machine <ul style="list-style-type: none"> → Cost reduction
Almonds sorting	As almonds are	Improvement through training

	qualified in different grades, having different prices, weaknesses in sorting decrease the mean price of each kg of almonds	→ Contributes to the increase of the mean price of a kg of almonds by 0.4US\$ (7%).
Almonds packing	Non optimized practices	Improvement through training → Reduces losses and contributes to the increase of the mean price of a kg of almonds by 0.4US\$ (7%).
Almonds commercialization	Insufficient quality for some customers	Improvement of the quality of nuts and → Better acceptance on international markets allowing sale of production Increase of the certified portion of the production up to 100% and better promotion of EcoCert and Flo certificates → Contributes to guarantee 20% higher selling prices.

51. The project aims to be profitable without selling carbon credits. A priori, Wouol will not engage in the carbon certification, as it can be constraining in terms of monitoring of plantations. This option may be studied in the future.

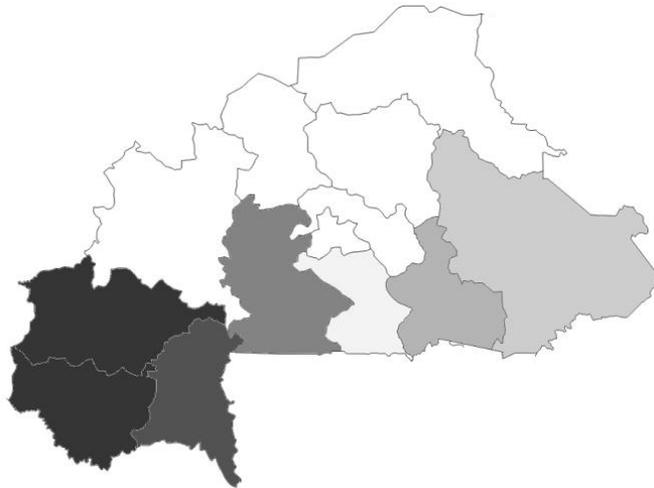
52. During the preparation of the concept note, there was an attempt to develop a full operation account integrating discount rates, interest rates and inflation, but too many assumptions remain to clarify to establish a reliable one.

VII. Market

53. The first cashew plantations were set up in Burkina in the 60's by the "*Centre Technique Forestier Tropical*" (CTFT). The aim was to restore degraded soils in the savanna area and to fight against desertification. The sale of cashew nuts only started in the 80's.

54. Nowadays, cashew plantations cover around 66,000 ha in Burkina and cashew producers are estimated at about 45,000 persons. The area per producer is between 0.5 and 50ha, but mostly between 2 and 10ha. Some plantations covering over 100 ha have appeared recently, but remain very rare. Cashew plantations are found principally in the regions of Cascades, Sud-Ouest and Hauts Bassins, in the South-West of the country.

55. The following map shows production regions in Burkina Faso. The darker the region, the more important is nut production.



56. Nuts are harvested from January to May. Yields are generally very low (around 400kg/ha) due to the use of un-selected cashew trees and a lack of good plantation management practices (iCA, 2010). 25,000 to 30,000 tons of raw nuts are produced each year in Burkina (around 1% of the global production) and only 10% are transformed in Burkina.

57. The raw nuts and almonds are exported, mainly to India (raw nuts), the EU and the USA (almonds). Raw nuts are purchased by subsidiaries of international companies based in Burkina, local sellers (few) and occasional foreign buyers.

58. The farm gate price is highly variable and depends mainly on the Indian market, which absorb a large part of the global production. This price is between \$220 and \$875 per ton of raw nuts, ensuring a farmer revenue estimated between \$150 and \$450\$/ha/year (hypothesis of 600kh/ha). The price is usually around \$500. The fair-trade and organic certification maintains the price above \$600/ton of raw nut (20% of premium, compared to non-certified raw nuts).

59. The Free On Board price for almonds is around \$5.8/kg for non-certified nuts and \$6,8/kg for certified ones (15% of premium, compared to non-certified almonds). The difference is quite small (17% of the non-certified product), but certified products benefit from better access to international markets, especially in the EU and the USA.

60. The trading of raw nuts faces a problem: everything is exported and the global demand has been on the rise for the last ten years. Installed capacities are far below the level of production of raw nuts (8,200 tons/year of processing capacity in 2010, around 27% of the production) and local processing units are competing with foreign buyers for their supply of raw nuts: there is high potential for developing plantations and processing units alongside each other, in order to market locally-produced and processed cashew nuts.

61. These facts are summarized below, in a SWOT analysis of the sector carried out by iCA:

Strengths	Opportunities
<ul style="list-style-type: none"> • A major part of cashew plantations with young trees or at full production. 30 000 tons available • Links with the European market • Existing support structures • Labor force available 	<ul style="list-style-type: none"> • Growing international demand • Stakeholders improve their practices on a voluntary basis • Existing financing structures • Government interest for the sector • New sources of funding
Weaknesses	Threats
<ul style="list-style-type: none"> • Weak organization of the value chain • Variability of the raw nuts prices • Insufficient quality of nuts • Lack of knowledge of good practices for production and transformation • Weak synergies between support organizations • Low availability of working capital • Low processing capacities 	<ul style="list-style-type: none"> • Decrease of the price of raw nuts on international markets • Difficulties to sell raw nuts • High variability of the foreign demand for exported raw nuts

VIII. Financial Plan (Indicative)

Source of Funding	Amount (USD million equivalent)	Percentage (%)
Project developer	561,000	9
Producers	1,794,000	28
FIP	4,017,000	61
Bilaterals (grant from OXFAM and BioVisio)	142,000	2
TOTAL	6,513,000	100

IX. Expected Results and Indicators

Results	Indicators
Degraded lands restored with cashew tree plantations	Area planted on degraded land → 5,300 ha
Added-value of the cashew value chain maintained in Burkina Faso	Volume of raw nuts processed → 85,000 tons of raw nut
Mitigation of climate change through carbon storage in plantation and avoided deforestation	Carbon balance of the project → 363,000 teCO ₂
Better plantation management practices adopted by the producers	Yields → 900 kg/ha on 5,300 ha

Incomes of rural population increased	Incomes from the cashew selling → \$400/ha/year on 7,250 ha
Creation of jobs with the increase of the production	Number of new employees/farmers → 1,200 employees and 400 new farmers

X. Implementation Feasibility and Arrangements

62. The project can start as soon as the loans are delivered by the FIP and the AfDB. This project has been identified for many months and Wouol are looking for investors. Producers to mobilize, equipment to buy and training to provide are presently being identified. As of early 2014, the first activities will be the following:

- Plantations: increase capacity of the nurseries, contracting with identified producers, and first training on planting practices;
- Processing: purchase of the equipment and building of warehouses;
- Marketing: setting up of the laboratory for analysis of finished products, training of agents responsible for quality, and elaboration of a quality manual.

XI. Potential Risks and Mitigation Measures

Risks	Level of risk and measures
Deforestation	Cashew is not identified as a driver of deforestation, neither in the R-PP nor in the FIP IP. However, some forested lands (notably savannas) could be replaced by cashew plantations. Under the project and in line with the Forest Code, it will be forbidden to replace savanna areas by cashew plantations.
Land conflicts	The mix of traditional vs “positive” land tenure system sometimes creates misunderstanding on the nature of the land transactions. These transactions are sometimes contested by third parties. Wouol will work closely with the Communes and the <i>Commissions villageoise de conciliation foncière</i> , and verify land titles before creating new plantations. As the law recognizes the traditional use and property rights and allows regulating the use of land through land tenure charters established in a participatory manner, the risk of spoliation is greatly reduced.
Fires	A study carried out by the GIZ (2009) estimates that 4% of the cashew areas are burnt every year. Plantation management practices promoted by Wouol include fire prevention practices (fire breaks, grass cutting, etc.)
Lack of market access	This risk seems low: Wouol already receives many offers from foreign buyers. Organic and Fair-trade certification increase Wouol’s capacities to trade almonds in European and American markets. As

	underlined earlier, a wide part of the global market is still accessible.
Credit default by planters	In case of credit default, seizing the cashew productions (at least 300kg/ha/year on 5 300 ha for a minimal price of \$0.22 /kg -> \$350 000year) would reimburse the loans within 2 years.

Annex 1: Estimation of climate change mitigation

	WOUOL	ExAct	Other source	Units	Comments
Production					
Transformation rate	0,20	0,18			
Production of nuts	3 246			t/year	
Production of almonds	649			t/year	
New plantation areas	5 300	22 730		ha	
Mean plantation area through the project	4 107			ha	
Yield	0,90	0,40		t/year	
Emissions due to fires	0,05			tCO2e/ha/year	
Emissions due to fires	194	1 072		tCO2e/year	
Above ground biomass in a 10 year plantation	26	26		tons of dry biomass	
Carbon fraction	0,5		0,5		Source: default value from the IPCC
Carbon storage in the ABG of a 10 years plantation	47,7			tCO2e/ha	
Root to shoot ratio	0,28		0,28		Source: GOF-C-GOLD sourcebook, based on IPCC default values for subtropical dry forest with aboveground biomass >20t/ha
Carbon storage in the bellowground biomass of a 10 years plantation	13,3			tCO2e/ha	
Storage in soils	0,33	0,33		tCO2e/ha/year	
Transformation					
Nuts heating (wood and nutshells burking)					
Emissions for a ton of almonds without extraction of CNSL	2,62	2,62		tCO2e/tons of almonds	
Quantity of almonds tranformed by all artisanal units in Burkina	-	1 291		t/year	
Emissions for all artisanal units of Burkina with extraction of CNSL	-	41		tCO2e/year	
Emissions for a ton of almonds with extraction of CNSL	0,03			tCO2e/tons of almonds	
Emissions for the 263 tons of almonds produced by Wouol without extraction of CNSL	689			tCO2e/year	
Emissions for the 263 tons of almonds produced by Wouol with extraction of CNSL	8,4			tCO2e/year	
Almonds drying					
Butane consumption	0,5			kg/kg of almonds	
Butane emission factor			2,59	tCO2e/tep	Source: ICEDD, Belgium (http://www.renovationdurable.eu/Notions-Valeurs-de-conversion.html)
Conversion tep/kwh			11 628	kWh/tep	Source: ICEDD, Belgium (http://www.renovationdurable.eu/Notions-Valeurs-de-conversion.html)
Conversion kg butane/kWh			13	kWh/kg	Source: ICEDD, Belgium (http://www.renovationdurable.eu/Notions-Valeurs-de-conversion.html)
Emissions due to almonds drying	1,41			tCO2e/tons of almonds	
Current emissions (263 tons of almonds produced)	372			tCO2e/year	
Transport					
Emissions due the transport from the field to the tranformation units	0,01	0,01		tCO2e/tons of gross nuts	
Emissions of export	0,30	0,30		tCO2e/tons of product	From the field to India
Total emissions per tons of almonds	0,31			tCO2e/tons of almonds	
Carbon balance of the project					
Project duration	20			years	
Storage in plantations	350 478			tCO2e	
Emissions due to fires	3 874			tCO2e	
Net storage in plantations	346 604			tCO2e	
Emissions due to transport	4 026			tCO2e	
Emissions due to transformation	412			tCO2e	According to the Ex-Act study, it is possible not to consume butane, electricity and fuel
Avoided emissions from current transformation	21 051			tCO2e	
Net balance (storage)	363 217			tCO2e	
Net balance (storage)	18 161			tCO2e/year	
Project cost	6 513 401			US\$	
Cost per tCO2e	17,9			US\$/tCO2e	