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HOW STRUCTURES OF AGRICULTURAL VALUE CHAINS INTERLINK WITH EMPLOYMENT AND INCLUSIVENESS? INSIGHTS FROM VCA4D STUDIES

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Abstract

This paper aims at exploring the interlinks between structural components of agricultural value chains (VCs), employment, and inclusiveness. By using data from the agricultural VCs analyzed in the framework of the Value Chain Analysis for Development (VCA4D) project, which includes domestic VCs studies in Africa, Asia, Latin America and the Caribbean, this paper proposes a typology of VCs, based on indicators related to product and market features as many examples in the literature but also on indicators repositioning the VCs in their macroeconomic environment. The results show differentiation between VCs depending on the product and market features, but also according to the contribution of the VCs' value added to agricultural GDP, the rate of integration of the VCs in the national economy and the weight of VCs actors (agricultural producers, traders, processors, suppliers) in the wealth generated by the VCs, as these elements may have strong relations with employment. Confronting the results with indicators on employment (in quantity and quality), the paper allows a broader tentative to discuss on how VCs structures influence diverse dimensions of inclusiveness. This reflection also demonstrates the need to build an information system so that robust data can be easily accessed for such analysis.

Introduction

While earlier research studies on agricultural value chains (VCs) focused on improving competitiveness of supply channels, recent works have instead centered on inclusiveness (Vos and Cattaneo, 2020) to increase opportunities for the poor (Minten et al 2009), the smallholders (Franz et al 2014) or the women (Barrientos et al., 2003; Maertens et al 2013; Malapit et al 2020). With the rapid globalization of agrifood markets worldwide, VCs have undergone profound transformations in the last decades (Reardon and Barrett, 2000). Today, it is common that a small number of multinational or national companies control VCs, by then controlling an increasing share of the value created, even though a large number of farmers, and sometimes smallholders, are actively the basis for creating value. These transformations have created new forms of employment that engender both risks and opportunities for workers. In some cases, VCs have offered new quality of employment opportunities and better paid jobs for men and women involved in VCs (Fabry et al 2022). Yet, in other cases, these changes might have been a means to maintain informal jobs, low-paid, and precarious working conditions (Cramer et al 2017). These changes have affected all kinds of VCs, export ones but also VCs oriented towards domestic markets (Benali et al 2018). Addressing the contribution of agricultural VCs to employment is crucial to foster sustainable food systems. It is even more crucial to question their role in inclusiveness, as employment alone does not make it possible to consider who benefits from the jobs created and how VCs share the value created among the actors they engage.

The paper is a first attempt to conduct a cross-cutting analysis among the Value Chain for Development project (VCA4D) studies to address employment and inclusiveness of agricultural VCs. Therefore, important questions to be tackled are the following: How do the VCs differentiate in terms of structures? In the different VCs, how many jobs are created? For which actors? In what kind of working conditions? How do the actors share the value created within the VC? In other words, what is the distribution of wealth created within the VCs (one of the VCA4D's indicators of inclusiveness)?

In the first section, we present the methodology, including the selected indicators and analysis. In a second section of the paper, we present the results of the typology of the value chains' structures, that we discuss in a third part of the paper, comparing with the results from other structural typologies of VCs that have been developed in the literature, to answer our questions related to employment and inclusiveness. We finally conclude the paper with some perspectives to improve the method developed to better consider employment and inclusiveness, when supporting the agricultural value chains for sustainable development. We also make some recommendations for improving such crosscutting analyses.

1 Design of a typology as a means to identify structural factors influencing employment and working conditions, and inclusiveness

1.1 Definition of concepts used in the paper

The term 'Value Chain' (VC) refers to a concept from business management that was first described and popularized by Michael Porter in his 1985 best seller, Competitive Advantage: Creating and Sustaining Superior Performance (Porter, 1985). This term aims at describing the activities within and around an organization to analyze the competitive strength of the organization. Therefore, a VC analysis evaluates which value each particular activity adds to the organizations' products or services. Porter argued that the ability to perform particular activities and to manage the linkages between these activities is a source of competitive advantage (ibid). Considering this definition, an agricultural VC refers to a set of actors and activities that bring a raw product (from plant or animal production, including fisheries) to the final consumer, where at each stage value is added to the product. An agricultural VC involves for instance agricultural production, processing, packaging, storage, transport and distribution.

Employment refers to economic activities conducted in the VC. These activities can be formal or not, and refer to both waged activities or self-employment, which is common in agriculture, especially in the developing countries.

To build a discussion around the contribution of VCs to employment, we developed a loose framework led by the following sets of questions: How many jobs are created in the VC? Who are concerned by the jobs created, more precisely, who are the actors included in the VCs (small-scale versus other farmers, farm-hired waged workers and wage-earners at other stages, producers' organizations, and other actors at the downstream level, but also inclusion of women in economic activities and labor in the VC)? What is the quality of the jobs created, meaning what are the working conditions (including various dimensions of working conditions and the social organization within the VC)? Finally, a last set of questions interrogates the notion of 'shared value' meaning the distribution of wealth created along the VC. Indeed, we define inclusiveness as the capacity of the VCs to distribute fairly the value created among the activities of the VC, in particular among women and small-scale producers.

1.2 Selection of VCs for a Structural Analysis

The methodology starts with the selection of agricultural VCs that were analyzed to identify structural factors possibly influencing employment, working conditions, and inclusiveness. To do so, we selected 39 VCs (all the VCA4D studies available at the time of the analysis)¹ that correspond to 27 countries and 20 products (crops and animal products, raw and processed).

¹ Some studies were conducted at the same time for different products. Two VCA4D reports included more than one product: the Dominican Republic pineapple and mango, and the Guinea Bissau lime and mango.

These VCs are interesting for their ability to illustrate the diversity of production models they display.

	ID	Product	Country	Type of country	Product feature / processing* in the country	Market feature
1	CAM_aqua	Aquaculture	Cambodia	Lower middle income	Perishable animal product	Mostly locally consumed
2	GEO aqua		Georgia	Upper middle income	Perishable animal product	Mostly locally consumed
3	ZAM_aqua		Zambia	Lower middle income	Perishable animal product	Mostly locally consumed
4	BUR_ban	Banana	Burundi	Lower middle income	Staple food crop partially processed (beer)	Mostly locally consumed
5	DOM_ban		Dominican Republic	Upper middle income	Perishable product, that can be packaged	Mostly exported
6	ESW_beef	Beef	Eswatini	Lower middle income	Perishable animal product, that are slaughtered	Mostly locally consumed
7	ZIM_beef		Zimbabwe	Lower middle income	Perishable animal product, that are slaughtered	Mostly locally consumed
8	MAL_cash	Cashew	Mali	Low income	Raw product, partially processed	Mostly exported
9	SIE_cash		Sierra Leone	Lower middle income	Raw product, partially processed	Mostly exported
10	COT_cass	Cassava	Côte d'Ivoire	Lower middle income	Staple food crop processed	Mostly locally consumed
11	CAM_coc	Cocoa	Cameroon	Lower middle income	Raw product, little processed	Mostly exported
12	ECU_coc		Ecuador	Upper middle income	Raw product, little processed	Mostly exported
13	PAP_coc		Papua New Guinea	Lower middle income	Raw product, little processed	Mostly exported
14	NIC_coc		Nicaragua	Lower middle income	Raw product, little processed	Mostly exported, also consumed locally
15	STP_coc		Sao Tome and Principe	Lower middle income	Raw product, little processed	Mostly exported
16	ANG_cof	Coffee	Angola	Lower middle income	Raw product little processed	Mostly exported
17	ECU_cof		Ecuador	Upper middle income	Raw product little processed	Mostly exported
18	HON_cof		Honduras	Lower middle income	Raw product little processed	Mostly exported
19	TAN_cof		Tanzania	Lower middle income	Raw product little processed	Mostly exported
20	CAM_cot	Cotton	Cameroon	Lower middle income	Raw product processed	Mostly exported
21	ETH_cot		Ethiopia	Low income	Raw product processed	Mostly locally consumed
22	ZAM_egg	Egg	Zambia	Lower middle income	Perishable animal product	Mostly locally consumed
23	GAM_fish	Fisheries	Gambia	Low income	Perishable animal product, partially processed (smoked, dried)	Mostly locally consumed
24	MAL_fish		Mali	Low income	Perishable animal product (smoked, dried)	Mostly locally consumed
25	KEN_bean	Green Beans	Kenya	Lower middle income	Perishable product, partially processed (canned, packaged)	Mostly exported
26	GHA_nut	Groundnut	Ghana	Lower middle income	Staple food crop processed (many)	Mostly locally consumed
27	GB_lim	Lime	Guinea-Bissau	Low income	Perishable product partially processed (vinegar)	Mostly locally consumed
28	NIG_maiz	Maize	Nigeria	Lower middle income	Staple food crop processed (flour)	Mostly locally consumed
29	ZAM_maiz		Zambia	Lower middle income	Staple food crop processed (flour)	Mostly locally consumed
30	BF_mang	Mango	Burkina Faso	Low income	Perishable product partially processed (juice)	Mostly locally consumed
31	GB_mang		Guinea-Bissau	Low income	Perishable product	Mostly locally consumed
32	DOM_mang		Dominican Republic	Upper middle income	Perishable product partially processed (dry fruits, marmalade, juices)	Mostly exported
33	BUR_milk	Milk	Burundi	Lower middle income	Perishable animal product	Mostly locally consumed
34	SIE_palm	Palm oil	Sierra Leone	Low income	Raw product processed	Mostly locally consumed
35	BEN_pine	Pineapple	Benin	Lower middle income	Perishable product partially processed (juice)	Mostly exported
36	DOM_pine		Dominican Republic	Upper middle income	Perishable product, that can be processed (concentrate, marmalade)	Mostly consumed at the national level
37	TOG_pin		Togo	Low income	Perishable product partially processed (juice, dried)	Mostly exported
38	GHA_sorg	Sorghum	Ghana	Lower middle income	Staple food crop partially processed (beer)	Mostly locally consumed
39	PAP van	Vanilla	Papua New Guinea	Lower middle income	High value raw product	Mostly exported

Table 1 - Main features of the selected Agricultural VCs

*Partially processed: part of the production is processed inside the country for domestic consumption or export (other part is exported as raw product or fresh and processed or consumed fresh abroad), for example pineapple juice // little processed: first step of post-harvest transformation is done inside the country (further or second more technical transformation for consumption is done abroad), for example fermentation or drying of beans.

1.3 Data, Indicators and Method of Analysis

Various sources of data were mobilized in the paper. First, we used data extracted from the VCA4D studies:

- Value Added (direct and total²) of the value chain (respectively VAD and VAT)
- Number of Full Time Equivalent (FTE) of wage-earners involved in the value chain
- Number of actors involved in the value chain, including self-employed producers and all the other actors such as agribusinesses, intermediaries, etc. (Actors)
- Number of agricultural producers involved in the value chain (Prod)
- Number of small-scale agricultural producers involved in the value chain (SmProd)
- Annual value of wages in the value chain (Wages)
- Value of exports from the value chain (Export)
- Value of the agricultural production (Production)
- Value added at the production level (VA Prod)
- Value added of the transformation in the value chain (Transfo)
- Value of the subsidies in the value chain (Subsidies)
- Value of the taxes in the value chain (Taxes)

Second, we also used data extracted from the international databases:

- Total Employment in the country (modeled estimates), includes self-employment from ILO country database (Tot Empl) from <u>ILOSTAT - The leading source of labour statistics</u>
- Agricultural Employment (modeled estimates), includes self-employment from ILO country database (Ag Empl), same source.
- Value of the Yearly minimum wage in agriculture, from https://www.minimum-wage.org (Min Wage)

This data made it possible to calculate relevant synthetic indicators for each VC.

To differentiate agricultural VCs, we set structural indicators through different economic dimensions, considering product and market features of the VC, the capacity to create value at each stage of the VC, the size (or weight) of the VC in the agricultural sector and the distribution of wealth within the actors engaged in the VC. Considering the available data, we conducted correlation tests³ before selecting final indicators (see Appendices). Due to strong correlations among some of the indicators and according to rational choices, we selected the following indicators as active variables to run the Principal Component Factor Analysis (PCA):

- **VAT/Ag GDP.** This indicator relates the contribution of the VC (including providers' VA) to the creation of national wealth in the agricultural sector (GDP);
- **Production/VAD.** This indicator measures the weight of the agricultural production in the creation of value within the VC;
- **Transfo/VAD.** This indicator measures the share of direct value added related to processing activities showing the economic weight of processing in the VC;

² Direct value added is the sum of the VA generated by all the actors operating within the VC limits (i.e. actors producing, processing or channeling the VC product). Total value added adds up the sum of the VA generated by all the external suppliers to the VC (i.e. actors providing intermediate goods and services to the VC actors, therefore not handling nor processing the VC products) to direct value added.

³ Correlation tests of the selected indicators were carried out with SPSS software (v20.0).

- **Wage/VAT.** This indicator measures the share of direct value distributed as incomes to wage workers reflecting the role of waged-employment in the value chain;
- **Export/Production.** This indicator indicates the share of markets targeted by the value chain (local/national/domestic versus international);
- VAD/VAT. This indicator measures the share of direct VA in total VA, it relates the weight of direct actors (agricultural producers, traders, processors) to the wealth generated by the VC (suppliers included)
- VAT/t (normalized between 0 and 1). This indicator measures the total value added generated when producing 1 ton of product, evaluating the capacity of the value chain to create value.
- **Rate of integration**. This indicator refers to the capacity of the actors of the VC to be supplied with goods and services produced inside the country instead of abroad and so to generate indirect VA for domestic suppliers and so spill-over effects in the national economy

We also kept other indicators as inactive variables, to link structures with employment and inclusiveness:

- (FTE+Actors)/Tot Empl. This indicator relates the contribution of the value chain to national total employment (both self-employment and waged employment);⁴
- (FTE+Actors)/Ag Empl. This indicator relates the contribution of the value chain to national agricultural employment (both self-employment and waged employment);
- SmProd/Prod. This indicator concerns the weight of small-scale agricultural producers (SmProd) among all agricultural producers (Prod) in the VC;
- Prod/Actors. This indicator refers to the number of agricultural producers in overall actors involved in the VC;
- Average wage labor for an FTE = (Wage/FTE)/Min Wage. This indicator refers the level of remuneration of the waged labor in the value chain to the minimum wage in the agricultural sector in the country;
- Subsidies/Taxes. This indicator compares subsidies (costs) to the benefits (taxes) highlighting the contribution of the value chain to public finances (if <1) or the contribution of public finances to the VC (if >1);
- Taxes/VAD. This indicator refers to the contribution of the value chain to public finances through taxes;
- The total number of actors and wage earners (FTE+Actors) involved in the value chain (normalized between 0-1).

In addition to these variables, we also used qualitative variables on several domains to qualify employment. These variables are extracted from the social profiles' of VCs diagnosed in VCA4D studies, which are developed according to a scoring approach used by the experts. Indeed, the experts use a method (see in the Appendices), which aims both to understand how the VCs influence the social realities of actors and how the activities of the VCs have an effect on this social context. The experts' assessment is based, depending on the questions, both on national and international objectives and norms (conventions, standards, public policies), but also on

⁴ There is a bias for this indicator as we add equivalent full-time waged employees to a number of self-employed actors that are not equivalent full-time; and these actors may be involved at different levels according to the VC (the actors are mainly multi-products in the agriculture sector). We will be aware of this bias in the comments of the results.

contextualization and comparison of the situation studied at the country level (i.e. comparison with other VCs). Thus we used variables covering the following domains:

- Working conditions: Respect of labor rights related to national standards, Child Labor, Job Safety, Attractiveness (4 variables)
- Gender equality: Economic activities, Hardship and division of labor (2 variables)
- Social capital: Strength of producer organizations (1 variable)

We then built a typology according to a mixed approach that relies on statistical analysis. We built a typology based on a standardized Principal Component Factor Analysis (PCA), followed by a Hierarchical Ascendant Classification (HAC), which was performed using SPAD software (v9.0).

2 Results

2.1 Proposition of a Typology of VCs Grounded on Structural Indicators

The results of the PCA launched with eight (8) out of the sixteen (16) active quantitative variables + eight (8) illustrative variables + seven (7) qualitative indicators, show that the first three (3) axis concentrate 60.2% of the information and their values are higher than the Kaiser criterion (see Table 2).

Axi		% of explained	% of explained cumulative	Retained according to		
s	Axis vanance (eigenvalue)	variance	variance	Kaiser criterion		
1	2,045	25,6	25,6	Х		
2	1,461	18,3	43,8	Х		
3	1,312	16,4	60,2	Х		
4	0,968	12,1	72,3			
5	0,901	11,3	83,6			
6	0,618	7,7	91,3			
7	0,473	5,9	97,2			
8	0,222	2,8	100,0			
Tot						
al	8,000	100,0	100,0			

Table 2 - Variance explained in the PCA

As stated by Table 3, the first axis (25.6% of the variance explained) refers to the distribution of value among the VC (including agricultural production, processing, wages, and rate of integration to the national economy).

- Wage/VAT, which contributes to 31.8%
- Transfo/VAD, which contributes to 20.7%
- VAD/VAT, which contributes to 20.1%
- Rate of integration, which contributes 16.9%

The second axis (18.3% of the variance explained) relates to the market orientation of the VC and weight of the VC in the agricultural sector.

- Export/Production, which contributes to 35.8%
- VAT/Ag GDP, which contributes to 21.2%

The third axis (16.4% of the variance explained) refers to the capacity of the VC to create value, in particular at the level of agricultural production.

• Production/VAD, which contributes to 43%

• VAT/t norm, which contributes to 26.9%*

Label of the variable	Axis 1	Axis 2	Axis 3
VAT/Ag GDP	2,6	21,2	3,4
Production/VAD	0,9	9,0	43,0
Transfo/VAD	20,7	15,4	0,6
Wage/VAT	31,8	0,7	1,9
Export/Production	0,5	35,8	21,8
VAD/VAT	20,1	15,8	1,9
VAT/t norm	6,4	2,2	26,9
Rate of integration	16,9	0,0	0,4

Table 3 - Contributions of active variables to the axis (in %)

Table 4 – Indicators explaining the typology of value-chains

Label of the variable	Fisher	Nb. of degrees of freedom	Value-Test	Probability
# Actors norm	0,757	32	0,275	0,609
(Wage/EFT)/Min Wage	0,592	27	0,623	0,733
SmProd/Prod	1,355	30	0,630	0,264
Prod/Actors	1,463	30	0,758	0,224
Taxe/VAD	0,537	32	0,760	0,776
Rate of integration	2,408	32	1,653	0,049
(EFT+Actors)/Ag Empl	2,895	32	2,002	0,023
VAT/Ag GDP	3,998	31	2,618	0,004
Production/VAD	4,050	31	2,644	0,004
VAD/VAT	4,503	32	2,872	0,002
Subsidies/ Taxes	5,158	32	3,148	0,001
Wage/VAT	6,932	32	3,756	0,000
Transfo/VAD	10,444	32	4,607	0,000
Export/Production	41,812	32	7,361	0,000
VAT/t norm	1393,540	30	12,296	0,000

2.2 Description of the VCs' Structures Types

Type 1: "Domestic market-oriented staple food, fruit and animal VCs" include 14 VCs, which represents 36% of the sample. The VCs of this type relate to staple foods (cassava, sorghum, maize and groundnut in Western Africa), animal products (milk, eggs, beef, fisheries and aquaculture) and fruits (bananas in Eastern Africa), mostly for the domestic markets, with the lowest capacity to create value (Total VA/t). All these VCs have a reduced contribution to agricultural GDP (9%). In all these VCs, a significant share of the value (51%) is created at the production level (low share of processing and wages). In these VCs, smallholders are significantly numerous in agricultural producers ($\frac{2}{3}$), but a significant number of downstream actors (marketing, distribution) can also be observed. These VCs have one of the highest rates of integration in the national economy (84%).

Type 2: "Small VCs that generate mainly downstream VA" include three value chains that represent 8% of the sample. The VCs of this type refer to fruits (mango) and fisheries, both for the domestic and export markets, with a greater potential to create value. They have a very limited contribution to agricultural GDP (3%). They also have the lowest share of the value added (20%) created at the production level, meaning that the value added is created at other levels (packaging, wholesaling, retailing, etc.). They have a relatively low share of smallholders among producers (67%), but a significant number of downstream actors. These VCs generate low indirect VA (highest Direct VA/Total VA, 96%) but have the highest integration rate (nearly 100%).

Type 3: "Small VCs of export-oriented partly processed products poorly integrated into the national economy" include 8 value chains that account for 20% of the sample. This type refers to VCs with export-oriented products, with a certain degree of processing/packaging (coffee in Latin America, cotton, green beans in eastern Africa, pineapple in Western Africa). They have the lowest contribution to agricultural GDP (2%). In these VCs, a moderate share of the VA (27%) is created at the production level (high share of processing and wages). They have a high share of agricultural producers (89%), including a great number of smallholders (limited number of downstream actors), but have one of the lowest rates of integration in the national economy (need for the import of inputs).

Type 4: "**Export-oriented raw commodities VCs dominated by smallholders**" includes 8 value chains that account for 20% of the sample. These also refer to export-oriented products, with a lower degree of processing/packaging (raw or bulk commodities, such as cocoa in Latin America, cashew nuts in Western Africa). All these VCs have a significant contribution to agricultural GDP (16%). They have the highest share of the value added (67%) that is created at the production level (low share of processing and wages). In these VCs, production is dominated by smallholders (92%). These VCs have one of the highest rates of integration in the national economy (86%).

Type 5: "Large domestic VCs, state-supported, with medium-sized producers" include only two VCs that refer to staple foods and animal products, mostly locally consumed (maize and beef in Eastern Africa). These VCs have the highest contribution to the agricultural GDP (33%), and have also a high share of the value added (51%) created at the production level, with a high number of producers among actors, but less numerous small producers. These VCs have the lowest rate of integration in the national economy (71%). They also have the highest level of subsidies/taxes.

Type 6: "**Export-oriented highly processed products VCs**" include three VCs that relate to export-oriented products, with the highest degree of processing (cotton but also cocoa in Sao Tome where the bean is processed in chocolate). These VCs have a moderate contribution to the agricultural GDP (9%); They have the highest share of the value added (76%) created at the processing level (and also higher share of wages). In these VCs, actors are dominated by agricultural producers (who also process products on farms). They have a moderate rate of integration in the national economy (79%) and a high level of subsidies/taxes.

3 Discussion

3.1 Is there a Country or a Product Effect on VCs' Structures?

This is the essential question when starting cross-study analysis, since some VCA4D studies refer to the same product in different countries or to various products in the same country. The first finding shows that countries do not characterize the types. Indeed, VCs from the same country can be in different types. However, products characterize the types, but the nature of a "product" is highly contextualized. The detailed data that drives this typology helps us to show that the same generic products can be classified into very different types: for example, the banana from the Dominican Republic (type 4), is a quality and mostly certified product since it is considered mainly as a commercial export commodity for a single use (fruit), while the Burundi banana (type 1) refers to a staple food products, partly self-consumed and widespread in the country for food security and multi-use (fruit, cooked vegetable, wine and beer).

3.2 What are the VCs' Structures better for Employment and Working Conditions?

Following this typology, the quantity and the quality of employment strongly varies among the types of VCs⁵. To that end, we used various indicators to interlink structures of VCs to employment related indicators. To assess the intensity of employment creation in the VC, we used the contribution of the VC to agricultural employment in the country ((FTE+Actors)/ Ag Empl) and the amount of people involved in the VC (number of actors plus number of FTE). We also used two other indicators to find out the importance of agricultural producers among all actors, and in particular smallholder ones. We further assessed the quality of employment in the VC, referring primarily to working conditions, but also to gender equity and social capital, and compared the level of remuneration of wage earners to national standards (Wage/FTE)/ Min Wage).

In terms of intensity of employment, except Type 5, all the types of VCs are marginal in terms of job creation for the agricultural sector. This finding needs to be analyzed considering a methodological bias in the VCA4D approach, as non-paid family farms' workforce may have been under-estimated (one farm = one actor). In addition, the quantity of jobs created highly depends on the economic size of the VC in the country (high correlation between (FTE+Actors)/ Ag Empl and VAD/Ag GDP).

All VC types engage numerous smallholders, but some types also create many jobs at other levels (marketing, packaging, processing), such as Types 1 and 2. Domestic food VCs engage many actors, not only at the production level.

Wages levels can be significantly higher compared to national standards, in particular for Types 1 and 6. In all other types of VCs, wages are lower than national standards, but it doesn't seem to have an effect on their attractiveness.

Inclusion of women is almost the same in all types: it is usually moderate or substantial, except of type 5 which is low.

Child labor can be an issue for Types 1 and 2. In many countries, children and teenagers are often contributing to agricultural production, which is "culturally" accepted. This situation does not seem to be related to the respect of labor rights. In addition, there is no effect of the market orientation on child labor.

Strength of producers' organization is the highest for export-oriented VCs, in particular when smallholders dominate the production level. However, it doesn't seem to have an impact on the level of wages, except for Type 6 (powerful unions of highly processed VCs).

3.3 What are the VCs Structures that allow better Inclusiveness (in terms of 'Shared Value')?

To answer this question, we used three indicators (Production/VAD, Transfo/VAD and Wage/VAD) to discuss how value is shared between stakeholders in the different types of VC with a broader discussion on inclusiveness.

⁵ One should note that the VCs studied by the VCA4D project were chosen by the national delegations of the European Union, which could drive a bias and the determinants of these choices were not necessarily linked to employment issues.

Figure 1 shows the comparison of VCs types through the indicators of growth potential and income distribution (without VC size effect).





VCs from Type 2, in spite of being well integrated in the national economy, have a low potential to create value and to share it "inclusively".

VCs from Type 1 are also well integrated in the national economy and have a better potential to share value but with a low potential to create value.

VCs from Type 6 and Type 3 create more value, but could be better integrated in the national economy (i.e. generating and sharing indirect domestic value and jobs instead of importing inputs)

The best situations in terms of inclusiveness could be found in:

VCs from Type 6: creation of value and inclusion of processors, workers, upstream suppliers

VCs from Type 4: well-integrated and inclusive for producers (in particular small ones).

4 Conclusion and perspectives

The paper's main objective was to discuss how the VC structures interlink with employment and inclusiveness. To that end, we developed a typology of VCs based on structural indicators relating product and market features and the capacity of the VC to create value per ton of product; market orientation (i.e. export versus domestic markets), but also on indicators repositioning the value chains in their macroeconomic environment (level of creation of value-added, rate of integration in the national economy; contribution of the VC to the creation of wealth through the agricultural GDP).

Contrary to other approaches, such as the recent effort of German et al. (2020) which relies on a smaller number of criteria⁶, the proposed typology is grounded on a broader range of criteria in relation with the situation of the VC in the national context (GDP, jobs), and it also adds new ones, such as the weight of different actors in the VC, a larger diversity of products (raw commodity,

⁶ The type of crops (traditional food crops, perishable, and bulk), the size of producers (in particular smallholders), the access of farmers to the VC (barriers to entry), the type of markets (local and national, distant), and the labor-intensity.

processed, animal products, fruits...), fiscal aspects, the integration into the national economy (effects, imports of inputs) and other macroeconomic indicators. Finally, additional qualitative information from the VCA4D studies allows for the establishment of this new finer-grainer typology that relies on structural, economic and social indicators.

The typology shows differentiation around VC depending on the product and market features (and in particular the difference between fresh and processed products, domestic and export markets, etc.), confirming the propositions of other typologies of VC. However, we show that it is difficult to classify VC as domestic VC or export VC since a majority of value chains are both markets oriented with a gradient of shares for each market even if one or another market can be dominant. The typology we developed also shows the importance of resituating VC in their macro-economic environment, as these elements have strong effects on employment, both in terms of intensity (quantity of jobs created) and quality (wages, working conditions, inclusion), and more broadly on inclusiveness *sensu largo*. Finally, regarding the VCA4D studies portfolio, it seems that the most supportive VCs of employment are the large ones targeting domestic markets with medium-sized producers and possibly state-subsidized (Type 6) and to a lesser extent the export market-oriented highly processed products VCs (Type 7); whereas the most adverse to employment are the small value chains with a low proportion of agricultural farmers, particularly of small producers and mainly trade-oriented (Type 2) and to a lesser extent the domestic market oriented staple food, fruit and animal VCs (Type 1).

Data and variables available for all VCA4D studies offer a great material to conduce much further analysis. The VCA4D information system is currently under construction, the attempt of conducing cross-study analysis in this paper will be useful to "point out" data issues, to "adjust" the data and indicators (meaning of variables) and to identify analysis to be done for the VCA4D information system.

Fine-tuning the way of standardizing employment indicators (including qualitative indicators of the social profile) is necessary to better consider family non paid workforce (1 farm \neq 1 actor), to systematically and correctly estimate the share of women engagement in VCs, at all levels and not only for wage laborers, but also to link qualitative indicators of the social profiles to tangible quantitative indicators, that would help to reduce the bias of the expert scoring. For instance : The scoring of Job safety could be justified with the number of work accidents in agribusiness or at farm level; Women empowerment could be scored with quantitative indicators (WEI); Child labor could be scored considering the ILO approach (which is available at country level); Access to land could be scored considering the number of producers owners of their farms etc.

Characterizing VC structures and linking them with employment provides additional insights to decision-makers to choose the development model to promote in support of a particular VC. If employment is a crucial issue for public policies in a specific country, this kind of statistical analysis, thanks to the VCA4D standardized method, might help decision makers to make trade offs. For instance, promoting value chains with a high number of producers, even if they do not substantially contribute to agricultural growth *versus* promoting VCs with high potential to generate wealth, even if they are not the ones that include the many.

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3. Biographical Information

Sandrine Fréguin-Gresh is a researcher at CIRAD (Agricultural Research Center for Development). She has more than 20 years of working experience in research in agricultural economics and rural geography. Some of the key areas of her expertise are in family farming, agrarian dynamics, rural migrations, value chain analysis and policies related to agricultural development. She experienced research in the Caribbean (Haiti, Dominican Republic, French Outermost Regions), in Africa (South Africa, Ethiopia, Madagascar) and Mesoamerica (Nicaragua), where she was locally-based working and where she had living experience from 6 months up to 5 years in each country. She was engaged in three VCA4D studies: the two processed fruits (mango and pineapple) in the Dominican Republic and the cocoa in Nicaragua value chains, where she was social export, and in the latter case, team leader.

Marie Hélène Dabat is an economist working at CIRAD, the French center dedicated to research on agriculture and development in partnership with many countries. She was scientific director of the VCA4D project from September 2016 to August 2022. She elaborates methodologies and performs impact assessment and multicriteria analysis of projects, value chains and policies. Her field of research is understanding for policy-makers how farmers link to local and global markets through agricultural value chains and food systems analyses. She has experience in analyzing staple food and commercial value chains, such as rice, seafood, cowpea, soybean, cassava, shea butter, vegetables, livestock, and also biofuels. She has lived several years in Madagascar working on sustainable rice sector development and urban agriculture in connection with city markets; and in Burkina Faso on agrifood value chain development and biofuels development.

Heval Yildirim has a PhD in economics. She is currently working as a research officer for the Value Chain Analysis for Development (VCA4D) project funded by the European Commission and implemented by Agrinatura. Analysis of agricultural value chains, territorial development, ecosystem services, local food systems are the main themes of her research expertise. She was awarded by the CIHEAM "Master of Science" Best Thesis Award in 2013. Her PhD thesis (2017) aims at setting up a bridge between the ecosystem services and territorial development research communities by suggesting a new concept, "the Basket of Ecosystem Services".

4. Appendices

Table 1 – Correlations between the available indicators

							Correlations							
			(EFT+Actors)/	(EFT+Actors)					(Wage/EFT)/			Subsidies/		
		VAT /Ag GDP	Ag Em pl	/TotEmpl	SmP rod /P rod	Prod/Actors	Prod/VAD	Transfo/VAD	Min Wage	Wage/VAD	Export/Prod	Taxes	Taxe/VAD	VADINAT
VAT (Ag GDP	Pearson Correlation	1	,618	,662″	,000	,178	,1 88	,021	-,156	,170	-,136	,338	,026	-177
	Sig.(2-tailed)		,000	,000	1,000	,291	,259	,900	,379	,300	,408	,035	,875	,281
	N	39	39	39	39	37	38	39	34	39	39	39	39	39
(EFT+Actors)/ Ag Empl	Pearson Correlation	,618 ^{°°}	1	,909″	-,354	,275	,154	,192	-,161	,217	-,264	,503	-,037	-,294
. <u>5</u> =þ.	Sig.(2-tailed)	,000		,000	,027	,100	,356	,241	,363	,185	,104	,001	,825	<i>,</i> 070
	N	39	39	39	39	37	38	39	34	39	39	39	39	39
(EFT+Actors) /TotEmpl	Pearson Correlation	,662"	,909	1	-,254	,232	,092	,123	-,109	,182	-,325	,311	-,029	-211
	Sig.(2-tailed)	,000	,000		,119	,167	,583	,454	,538	,267	,043	,054	,859	,198
	N	39	39	39	39	37	38	39	34	39	39	39	39	39
Sm Prod/Prod	Pearson Correlation	,000	-,354	-,254	1	-,128	-,083	-,087	-,203	,D02	,062	-,256	-,164	,233
	Sig.(2-tailed)	1,000	,D27	,119		,450	<u></u> б18	,598	,249	,990	,706	,116	,319	,1 53
	N	39	39	39	39	37	38	39	34	39	39	39	39	39
Prod/Actors	Pearson Correlation	,178	275	,232	-,128	1	,1 44	,256	-,054	,240	,317	,107	,172	-,173
	Sig.(2-tailed)	,291	,100	,167	,450		,394	,126	,768	,153	,056	,530	,308	,306
	N	37	37	37	37	37	37	37	32	37	37	37	37	37
Prod/VAD	Pearson Correlation	,188	,154	,092	-,083	,144	1	-,272	,094	-,1 09	,114	,234	-,108	-,086
	Sig.(2-tailed)	,259	,356	,583	,618	,394		,099	,604	,515	,496	,158	,518	,608
	N	38	38	38	38	37	38	38	33	38	38	38	38	38
Transfo/VAD	Pearson	,021	,192	,123	-,087	,256	-,272	1	-,034	,401 [°]	,254	-,047	,054	-,1 36
	Correlation Siq.(2-tailed)	.900	241	.454	.598	.126	,099		.848	,011	.119	.777	.743	,408
	N	. 39		. 39	. 39	37	. 38	39	. 34	39	39	39	39	. 39
(/Vage/EFT)/	Pearson	-,156	-,161	-,109	-,203	-,054	,094	-,034	1	,186	-,223	-,117	-,038	-,269
wiin vvage	Sig.(2tailed)	.379	.363	.538	.249	.768	604	.848		293	.205	.510	.830	.124
	N	34	34	34	34	32	33	34	34		34	34		34
Wage/VAD	Pearson Correlation	,170	217	,182	,002	,240	-,109	,401 [°]	,186	1	,248	,084	,030	-,478
	Sig.(2-tailed)	,300	,185	,267	,990	,153	,515	,011	,293		,129	,610	,858	,D02
	N	39	39	39	39	37	38	39	34	39	39	39	39	39
Export/Prod	Pearson Correlation	-,136	-,264	-,325	,062	,317	,114	,254	-,223	,248	1	-,175	,289	,279
	Sig.(2-tailed)	,408	,104	,043	,706	,056	,496	,119	,205	,1 29		,287	,075	,086
	N	39	39	39	39	37	38	39	34	39	39	39	39	39
Subsidies/ Taxes	Pearson Correlation	,3381	,503 "	,311	-,256	,107	,234	-,047	-,117	<i></i> ,084	-,175	1	-,111	-,3491
	Sig.(2-tailed)	,035	,001	,054	,116	,530	,1 58	,777	,510	_{,6} 10	,287		,503	<i>,</i> 030
	N	39	39	39	39	37	38	39	34	39	39	39	39	39
Taxe/VAD	Pearson Correlation	,026	- D37	-,029	-,164	,172	-,1 08	,054	-,038	<i>р</i> зо	,289	-,111	1	,D57
	Sig.(2-tailed)	,875	β25	,859	,319	,308	,518	,743	,830	,858	,075	,503		,7 30
	N	39	39	39	39	37	38	39	34	39	39	39	39	39
VADIWAT	Pearson Correlation	-,177	-294	-,211	,233	-,173	-,086	-,136	-,269	-,478"	,279	-,349	,057	1
	Sig.(2-tailed)	,281	p70	,198	,153	,306	608	,408	,124	,002	,086	,030	,730	
	N	39	39	39	39	37	38	39	34	39	39	39	39	39
**.Correlation	is significant a	at the 0.01 level	(2-tailed).											

*. Correlation is significant at the 0.05 level (2-tailed).

Table 2 - Quality indicators of the typology

Name	Before consolidation	After consolidation
Inertie intra-classes	0,943	0,943
Inertie inter-classes	3,875	3,875
Inertie expliquée (%)	80,430	80,430
Critère de Calinski-Harabasz (pseudo F)	21,919	21,919
Indice de Davies-Bouldin	0,738	0,738

Figure 1 and 2 show the results of the PCA and the dispersion of the VC case studies around the two first axes.









Table 3 - List of questions addressed in the social profile of the VCA4D méthodology

1.1 Respect of labour rights
1.1.1 To what extent do companies involved in the value chain respect the standards elaborated in the 8 fundamental ILO
international labour conventions and in the ICESCR
1.1.2 Is freedom of association allowed and effective (collective bargaining)?
1.1.3 To what extent do workers benefit from enforceable and fair contracts
1.1.4 To what extent are risks of forced labour in any segment of the value chain minimised?
1.1.5 To what extent are any risks of discrimination in employment for specific categories of the population minimised?
1.2 Child Labour
1.2.1 Degree of school attendance in case children are working (in any segment of the value chain)?
1 2 2 Åra childran protected from exposure to harmful inhs?
1.2 lob Safaty
1.3. Jub Salety
1.3. T Degree of protection from accidents and nearin damages (in any segment of the value chain)?
1.4 Attractiveness
1.4.1 To what extent are remunerations in accordance with local standards?
1.4.2 Are conditions of activities attractive for youth?
2 LAND & WATER RIGHTS
2.1 Adherence to VGGT
2.1.1 Do the companies/institutions involved in the value chain declare adhering to the VGGT?
2.1.2 If large scale investments for land aguisition are at stake, do the involved companies/institutions apply the 'Guide to due
diligence of agribusiness projects that affect land and property rights?
2.9 Transparency participation and consultation
2.2 11 and of prior disclosure of project related information to local stakeholders?
2.2.1 Level of profit disclosure of project related information to focal starteriolities :
2.2.2 Level of accessibility of intervention policies, laws, procedures and decisions to all stakeholders of the value chain?
2.2.3 Level of participation and consultation of all individuals and groups in the decision-making process?
2.2.4 To what extent prior consent of those affected by the decisions was reached?
2.3 Equity, compensation and justice
2.3.1 Do the locally applied rules promote secure and equitable tenure rights or access to land and water?
2.3.2 In case disruption of livelihoods is expected, have alternative strategies been considered?
2.3.3 Where expropriation is indispensable: is a system for ensuring fair and prompt compensation in place (in accordance with the
national law and publically acknowledged as being fair)?
2.3.4 Are there provisions foreseen to address stakeholder complains and for arbitration of possible conflicts caused by value chain
investments?
3.1.1 A risks of women heing evaluated from certain cogments of the value shein minimized?
3.1.1 He hists of women being excluded from certain segments of the value chain minimised?
3.1.2 To what extent are women active in the value chain (as producers, processors, workers, traders)?
3.2 Access to resources and services
3.2.1 Do women have ownership of assets (other than land)?
3.2.2 Do women have equal land rights as men?
3.2.3 Do women have access to credit?
3.2.4 Do women have access to other services (extension services, inputs)?
3.3 Decision making
3.3.1 To what extent do women take part in the decisions related to production?
3.3.2 To what extent are women autonomous in the organisation of their work?
3.3.3 Do women have control over income?
3.3.4 Do women have control over income:
3.3.4 Do women call independent income ?
3.3.5 Do worten take part in decisions on the purchase, sale or transfer of assets?
3.4 Leadership and empowerment
3.4.1 Are women members of groups, trade unions, farmers' organisations?
3.4.2 Do women have leadership positions within the organisations they are part of?
3.4.3 Do women have the power to influence services, territorial power and policy decision making?
3.4.4 Do women speak in public?
3.5 Hardship and division of labour
3.5.1 To what extent are the overall work loads of men and women equal (including domestic work and child care)?
3.5.2 Are risks of women being subject to strenuous work minimised (e.g. using labour saving technologies)?
4 FOO AND AN ITRITION SECURITY
4.1 Avoilability of food
4. 1 Availability of 1000
4.1.1 Does the local production of food increase?
1.4.4.2 Are tood supplies increasing on local markets?

4.2 Accessibility of food
4.2.1 Do people have more income to allocate to food?
4.2.2 Are (relative) consumers food prices decreasing?
Average
4.3 Utilisation and nutritional adequacy
4.3.1 Is the nutritional quality of available food improving?
4.3.2 Are nutritional practices being improved?
4.3.3 Is dietary diversity increased?
4.4 Stability
4.4.1 Is risk of periodic food shortage for household reduced?
4.4.2 Is excessive food price variation reduced?
5. SOCIAL CAPITAL
5.1 Strength of producer organisations
5.1.1 Do formal and informal farmer organisations /cooperatives participate in the value chain?
5.1.2 How inclusive is group/cooperative membership?
5.1.3 Do groups have representative and accountable leadership?
5.1.4 Are farmer groups, cooperatives and associations able to negotiate in input or output markets?
5.2 Information and confidence
5.2.1 Do farmers in the value chain have access to information on agricultural practices, agricultural policies, and market prices?
5.2.2 To what extent is the relation between value chain actors perceived as trustworthy?
5.3 Social involvement
5.3.1 Do communities participate in decisions that impact their livelihood?
5.3.2 Are there actions to ensure respect of traditional knowledge and resources?
5.3.3 Is there participation in voluntary communal activities for benefit of the community
6. LIVING CONDITIONS
6.1 Health services
6.1.1 Do households have access to health facilities?
6.1.2 Do households have access to health services?
6.1.3 Are health services affordable for households?
6.2 Housing
6.2.1 Do households have access to good quality accomodations?
6.2.2 Do households have access to good quality water and sanitation facilities?
6.3 Education and training
6.3.1 Is primary education accessible to households?
6.3.2 Are secondary and/or vocational education accessible to households?
6.3.3 Existence and quality of in-service vocational training provided by the investors in the value chain?