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Alternative Crops in the Western Cape: Understanding definitions, concepts and criteria for selection

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1. Introduction

In 2014 the Western Cape Department of Agriculture (WCDoA) launched an "Alternative Crops Research Fund" (ACF), in collaboration with Hortgro and other industry stakeholders. The ACF seeks to provide research funding for alternative crops, especially those smaller industries which does not have the resources available to address important research needs. The initiative seeks to provide an environment and institutions that would facilitate the growth in these smaller industries in the Province (Troskie, 2014). It is obvious how such an initiative will contribute towards the number one goal in the Western Cape Government of creating growth and jobs (WCG, 2015), seeing that many of these crops have high export potential and job creation capabilities. Crucially, the ACF will support research & development and the sourcing of market information to support sound decision making and provide improved understanding of production of alternative crops in the Province. The WCDoA has been actively promoting alternative crops through research, market access support and via participation with industry in the past decade. Examples of research include work on rooibos and honeybush tea (Kaiser, 2011), natural products industry (Kaiser, 2015$_a$) and a study which analysed alternative food products relating to the African immigrant food market (Kaiser, 2015$_b$).

In support of this process, this short concept document seeks to provide clarity on definitions used in defining alternative crops and to create a framework by which the WCDoA can prioritise funding and support to these industries. The need to define alternative crops arises from the ambiguous usage of the term and it is often dependent on the specific context it is used. This report will assist the ACF in two distinct ways. First, using relevant literature and external sources a proper understanding of what defines alternative crops will be discussed. In this process a formal definition will be given to be used in future endeavours of the Fund. Second, this report will provide a framework in which alternative crops can be analysed in order to effectively allocate research funds to specific research projects. This will be done by providing existing information on those crops considered as Alternative, whilst also providing some indicators to be used as criteria in the process to award funding to specific industries.

2. Definitions and terminology used for Alternative Crops

From the outset it should be made clear that when it comes to referring "alternative crops" the definitions vary both in terms of the context it is used and confusion often results because terminology such as "niche", "speciality", "smaller" and "minor" is used as descriptions for crops. Scanning the literature for terms and definitions on alternative crops has yielded some general findings. First, the usage of these terms are dependent on both the specific context in which it is used and for most parts no

universal definition can be found for Alternative Crops. Furthermore, how to practically apply these definitions in different geographic areas is another challenge. For example, canola might be a major crop in the Western Cape, but might be considered an alternative crop in another Province or even a specific area within this Province. The challenge then becomes to decide on which definition should be used guide decision-makers through these complexities. One can therefore already anticipate that such ambiguous use will make it difficult for the ACF to conduct its activities and decisions if no universal set of definitions exist. To solve such difficulties, this section will provide some context of the different uses for alternative crops and those that relate to it to ultimately suggest a simple and clear definition of alternative crops going forward.

Table 1 below gives a summarised overview of the different terminology used to refer to so-called alternative crops. The ***minor crop definition***, according to Kim et al. (2012) consists of five parts: 1) cultivation of crops occur on limited hectares (smaller than 1000 hectares; 2) low gross revenues are generated; 3) crops are produced as a strain of major crops for niche markets; 4) research investment from private and public sectors are limited or non-existing; and 5) non-existent or diffused featured plant breeding activities. In the majority of cases, the minor (use) crop definition is used in the crop protection context where crop production in a specific country is not sufficiently large to justify registration of each crop for use of pesticides and insecticides (OECD, 2009). In the case of South Africa, the National Department of Agriculture, Forestry and Fisheries (DAFF) provides guidelines for the registration of minor crop uses and provides a list 73 different products (DAFF, 2010). Additionally, Blench (1997) suggests that minor crops also relates to crops on which limited research has been done and for which no world production statistics are not published.

Speciality crops can be defined as crops that are intensively cultivated and includes crops like fruits, vegetables, tree nuts, dried fruits, horticulture and nursery crops (including floriculture) fall under this category (Paggi, 2016; MDAC, 2017). A speciality crop is also referred to as a unique fruit or vegetable (Hobby Farms, 2009). The term speciality (or specialty) crop has been extensively used to in the context of producer support from the United States Department of Agriculture (USDA) which provides a grant to enhance the competitiveness of speciality crops by funding initiatives for food safety, plant pests and disease, research and marketing.

Niche crops are generally more focussed towards market opportunities rather than defining the characteristics of a particular group of crops. This implies that an agricultural product is a niche product if there are specific market opportunities as a result of a lack of supply from mainstream products. These are however mostly high-value crops produced on relatively small volumes and as a result are able to be grown for specific niche markets.

According to Isleib (2012) and the University of Kentucky (2011), ***alternative crops*** are defined as agronomic crops that are not usually grown in specific geographic areas (not your traditional crops) and its crops that are normally selected for use due to potential high sale value or specialized benefit to the farming system. Value-adding can also lead to higher value products of alternative crops as well as multiple uses of

Table 1: Definitions and terminology used to refer to alternative crops

Term	Meaning	Source
Minor (use) crops	Used in crop protection and use of insecticides and pesticides registrations. Typically relates to crops grown on a small scale (<1000 Ha) and often high-value crops.	Kim et al. (2012); OECD (2009); (ODI, 1997); DAFF (2010); Karsten (2017)
Speciality crops	Crops intensively cultivated (fruits, vegetables, tree nuts, dried fruits, horticulture and nursery crops (including floriculture)). A speciality crop is also referred to as a unique fruit or vegetable.	Paggi (2016); Hobby Farms (2009); (USDA, 2017)
Niche crops	Used to refer to specific market segment for a product, and services a small portion of a market segment, not readily served by mainstream products.	McCorkle & Anderson (2009);University Kentucky (2011); Karsten (2017)
Alternative crops	"Alternative" to be understood from a marketing and production point of view. Defined as an agronomic crop not usually grown in geographic areas (not your traditional crops) and its crops that are normally selected for use due to potential high sale value or specialized benefit to the farming system, export potential and possible opportunities of value-adding.	Isleib (2012); University of Kentucky (2011) Trautmann (2014), Troskie (2014) and Coetzee (2014)
Alternative (African) Products	Products were prioritised which were consumed by African immigrant population in the Western Cape. Alternative here reflect the consumption of traditional African crops such as cassava, okra, millet, yams which can potentially be produced in the Province.	Kaiser (2015)

Source: Own Compilation form various authors

the crop, which will be less risky when for example market factors don't look so viable anymore (Isleib, 2012). Alternative food products can also be defined in the context of health, where alternative products are compared to food that is produced in conventional methods. Here the organic industry and is specifically geared to provide such agricultural products which has seen the rise of movements such as the alternative food movement (Grauerholz & Owens, 2015).

Alternative crops are seen by WCDoA as smaller crop industries such as figs, fynbos, berries, honey bush tea, cherries, bee's honey and pomegranates (Trautmann, 2014; Troskie, 2014). According to Trautmann (2014), Troskie (2014) and Coetzee (2014) alternative crops are crops with a high export value. Karsen (2017) uses this definition in an agricultural context as plant researchers and defines it as crops that are not mainstream crops but are grown in an agricultural area. Example used is wheat, canola and barley that are grown in the Swartland area and growing Flax in that system may be considered as an alternative crop (Karsen, 2017). However in this case, all of these mentioned can be seen as an alternative crop in that specific region, but would be considered major crops in both the Western Cape and the rest of South Africa.

The criteria for projects to be funded are as follows (Trautmann, 2014):

- The Project has to contribute to food security and toward realising the objectives of the Agricultural Policy Actions Plan (APAP)
- It must have the potential to create jobs and sustain jobs
- It must have the potential to become economically viable and must be quantified in terms of industry benchmarks within a detailed business plan
- It must lead to increased services and infrastructure
- It must lead to increased exports
- It must be based in the Western Cape and address the priorities of the province's agricultural sector
- It must increase growth in production and business opportunities
- Only smaller crops associations will be considered

It is clear from the literature review that definitions and concepts used to refer to alternative crops are used in various contexts and applications. Seeing that no universally accepted definition exists and that the criteria mentioned above specifies key outcomes of the ACF, it is proposed that a flexible definition be adopted but should be based on the following:

> *"An Alternative Crop is defined as any horticultural product that is produced on smaller than 1000 hectares in the Western Cape, has a relatively high value (based on prices), is intensively cultivated (irrigated, shade netting, tunnels and high labour multiplier), has intrinsic export potential and has no Statutory Measures imposed on the specific industry according to the Agricultural Products Act, No. 47 of 1996 (MAP Act)"*

Within this framework crops which are major crops in South Africa, but considered as alternative crops in the Western Cape will be excluded. The reasoning here is that based on the fact that these industries have the needed resources to conduct its activities and are not considered a "small" industry in the rest of the country. For

example, the area planted for tomatoes and lime in the Western Cape is less than the 1 000 ha threshold, but in the rest of South Africa produced on a much larger scale and both has producer associations to represent these growers and extensive resources to conduct research activities. Thus, on the basis of the abovementioned definition, Table 2 below shows all crops in the Western Cape that are classified as alternative crops by just using the area planted criteria (Flyover, 2013).

3. Information and Data considerations

One of the biggest challenges in defining alternative crops is to have uniform set of indicators about these crops. In this section some of these realities will be mentioned and based on the definition provided this section will provide the reader with a general understanding of the available data on specific indicators which could be used for product selection purposes. Table 2 then provides a summary of various indicators and their source and each metric will be highlighted below:

Indicators:

Production information can be obtained from various sources, both private and public and primary or secondary. One of the objectives of the ACF is to support smaller industries to get more detailed information and therefore data remains 'n big challenge. ***Area planted*** measured in hectares is a good indicator for output in the case of alternative crops for two reasons. First, the WCDoA has initiated a project, called the Flyover (2013), to collect detailed information on land use in the Western Cape and will conducted every 4-5 years. This provides not only the hectares for each crop, but shows which fields are irrigated and/or which if shade-netting or tunnels are utilised. Thus, once the new Flyover is completed, the ACF would be able to see if there is any expansion in a specific crop and it will also reveal if new infrastructure and agri-processing facilities were added in the Province. Second, other measures for output does not exist from one source, but several and these often use different measures for output.

Production volumes are therefore another indicator that can be used, but in this case one must take note of the structure of different industries, particularly of products are mostly destined for the local markets or for exports. In the case of the former, using the volumes traded on the main National Fresh Produce Markets (Johannesburg, Tswane, Durban and Cape Town) give an idea of total production.

Table 2: Indicators for Alternative Crops selection

Indicator	Source
Area Planted (ha)	The WCDoA conducts and annual flyover survey project which captures the production of the majority of crops in the Western Cape (Flyover, 2013). Additionally Producers Associations collects some

	information on area planted.
Production Tons	Though not measuring total production, using the traded volumes (and prices) from all the Fresh Produce Markets give an clear indication of production volumes of many vegetable crops that are not available elsewhere.
Exported Tons	Many alternative crops such as berries are not traded in big volumes on the local Fresh Produce Markets but the majority of produce goes to international markets as exports. Here both the International Trade Centre (ITC) and the PPECB information are useful.
Competitiveness Measures	Trade data is mostly used in this instance either coming from the Food and Agricultural Organisation (FAO) or using ITC. The WCDoA has recently commissioned a study that give these measures at the HS-6 level and it uses the following measures: Revealed Comparative Advantage (RCA); Relative Trade Advantage (RTA) and the Relative Import Advantage (RMA) (BFAP, 2017)
Statutory Levies according to the MAP Act	The National Agricultural Marketing Council (NAMC) report annually on all of the Statutory Levies that are in place according to the submission by specific agricultural industries.
Prices	Because the majority of alternative crops are not commodities there are no clear world prices for products and prices are often volatile depending on various factors influencing supply and demand both locally and internationally. The ITC provides a proxy for export prices in the form Unit Values, while the Fresh Produce Market provides information to be able to calculate average wholesale prices for many of the alternative crops. These indicators could indicate the relative value of crops.
Employment	In general there are no secondary data available in the public domain which indicates the employment number per crop type in South Africa. Traditionally proxies for employment numbers has been generated using a multiplier approach either giving employment per hectare, of value of agricultural production. With Alternative Crops there is no clear indication of the employment multipliers for each product.

From this data one can get a clear indication of seasonality of products, their trading ***prices*** and the value of sales on a monthly basis (DAFF, 2017). When looking at alternative crops such as Blueberries, it is clear that very a very small proportion destined for the local markets and these are not distributed via the fresh produce markets in general. It is estimated that approximately 68% of all production is exported (Hortgro, 2017). In these cases the best indicator for production volumes will be to analyse ***exported tons*** that can be sourced from data coming from the PPECB or alternatively use trade data from the ITC. However, the accuracy of these sourced has been routinely questioned by industry representatives.

The WCDoA has also recently commissioned a study that calculated ***competitiveness measures*** of agricultural industries in South Africa and measures such as Revealed Comparative Advantage (RCA); Relative Trade Advantage (RTA) and the Relative Import Advantage (RMA) were calculated for all agricultural products. These could be used to see whether, based on the definition of alternative crops, specific crops have export potential and inherent competitive advantages (BFAP, 2017).

The National Agricultural Marketing Council (NAMC) provides an annual Status Report on ***statutory measures*** which gives a list of all of the industries that has levies assigned for specific functions such as research, information or transformation (NAMC, 2016). This survey shows which agricultural products are levied in terms of the MAP Act. One cause of concern here is that some industries has in the past had levies applied to them, but then decided not to continue with them.

Employment indicators at a low level of aggregation do not exist in official statistics. Statistics South Africa's Quarterly Labour Force Survey only gives an indication of employment number for the whole industry and for specific products. Various attempts have been made to get a sense of employment utilising multipliers, and in this case the information is collected from various industry sources and official report. Employment multipliers for the majority of the major crops produced in South Africa can be calculated, but in the case of alternative crops, of which very few has official statistics, there is in essence no way of know the employment numbers for each product.

Table 3 below gives the information gathered for each crop produced in the Western Cape and provides the majority of indicators given Table 2. This list can now be utilised in the process of selecting specific alternative crops for funding initiatives going forward. Using the definition given in Section 2, those products highlighted in green are products with export growth, grown in smaller than 1000ha in the Western Cape, has relative competitive advantages (RTA > 0) and does not have Statutory levies applied. Many of these products have already received funding from the ACF and therefore suggest that the existing decision-making aligns well with the indicators suggested in this Report.

4. Conclusion

The main aim of this report was to greater clarity on definitions used in defining alternative crops and to create a framework by which the WCDoA can prioritise funding and support to these industries. The literature review suggest that there is no uniform or universal definition used to refer to Alternative Crops, and its usage is mostly dependent the context in which it is used.

The brief summary of possible indicators to be used to define Alternative Crops provides a basis to prioritise specific crops for funding, in combination of the suggested definition for Alternative Crops in the Western Cape. Table 3 provides these indicators and lists all crops that were grown in the Province in 2013 and should be used as a baseline for future decisions for the Committee in assessing application for funding.

Table 3: Database on Crops grown in the Western Cape

Product	HS-code	Production (Tons in Brackets)		Exports			Competitiveness	Industry Structure	
		Hectares : RSA	Hectares : WC	Export Value 2015 in Rand ('000)	5 Year Annual Export Growth (%)	Export Volume: PPECB (Tons)	RTA: BFAP	Statutory Levy	Producer Association
Cherries	80921	225	111.00	4660	35.51	0.003	-0.22	No	SACherries
Eggplant	70930	(3254 T)	1.75	6273	60.88	12.217	0.03	No	-
Sunflower	120600	718500	4.35	20445	4.26	0	-2.81	Yes	SAGIS; Saflowers
Cucumber	70700	(375 T)	6.46	22511	18.62	8.941	0.14	No	-
Spring onions	70310	(598 T)	10.22	480015	19.86	0.019	1.95	No	-
Chillies	70960	(5064 T)	10.24	32638	25.16	19.563	0.04	No	-
Sweetcorn	71040	(373000 T)	20.80	15945	10.70	105.451	-0.84	No	-
Raspberries	81020	197	18.68	174123	21.04	955.316	1.62	No	SABPA
Garlic	70320	(44265 T)	19.47	30762	23.39	13.928	-0.15	No	SAGarlic
Melons	80719	(8895 T)	22.05	157108	76.24	582.047	0.73	No	-
Grapefruit	80540	7678	24.99	1560207	12.61	214387.88	27.48	Yes	CGA
Mango	8045090	7577	29.19	68779	18.71	2872.453	0.78	Yes	SUBTROP;SAMGA
Peppers	90411	(10173 T)	34.05	201148	27.70	105.699	-0.47	No	-
Grenadella	8109010	(21546 T)	34.21	242330	26.91	637.86	2.63	No	-
Celery	70940	(20520 T)	36.05	3473	5.08	11.498	0.21	No	-
Watermelon	80711	2133	95.85	14670	-1.59	16.832	0.07	No	-
Dates	80410	(705 T)	40.55	89018	16.07	837	0.23	No	-
Prickly pear	8109090	(620 T)	48.00	520846	33.70	30.221	2.63	No	SACPGA
Brussel sprout	70420	(88 T)	50.69	9511	3.98	129.73	1.02	No	-
Artichokes	70991	(29 T)	51.21	5906	21.45	0.316	1.27	No	-
Lavender	33012930	-	51.40	5129	46.16	-	0.18	No	SAEOPA
Blackberries	81030	46	60.10	923	34.99	2.66	0.11	No	SABPA

Herbs	71290	1492	65.40	26761	7.07	31.665	-1.23	No	-
Green beans	71022	4240	68.24	4660	8.60	9.931	-1.41	No	-
Peas	71021	(9000 T)	74.85	5628	2.76	2.023	-1.27	No	-
Buchu	33012990	-	83.94	62096	12.26	-	0.18	No	SAEOPA
Maize	100590	1946750	4391.76	4426990	-6.12	0	3.16	Yes	SAGIS
Spinach	70970	(9930 T)	131.82	2770	-4.35	11.276	0.22	No	-
Avocado	80440	9269	134.86	1058164	35.92	44002.589	6.12	Yes	SAAGA; SUBTROP
Coriander	90921	-	143.31	777	41.10	-	-3.52	No	-
Honey bush	121299	147	143.82	759146	29.40	-	8.82	No	SAHTA
Beetroot & Radish	70690	(78155 T)	162.26	38676	16.52	147.158	0.85	No	-
Strawberries	81010	(7054 T)	189.68	25545	35.91	25.727	-0.05	No	-
Sweet potato	71420	1109	199.01	28520	-12.76	1726.095	0.80	No	-
Lettuce	70511	(23590 T)	236.56	15579	0.70	86.301	0.28	No	-
Apple Pear	81090	-	239.66	757959	28.77	-	2.63	No	
Tomatoes	70200	10711	251.04	122213	9.46	137.37	0.20	No	TPO SA
Figs	80420	(1981 T)	288.40	46722	150.36	460.345	1.05	No	-
Blueberries	81040	471	399.15	365701	37.93	30.356	1.83	No	SABPA
Pumpkin & Butternut	70993	263726	536.62	117846	28.87	8970.8435	1.07	No	-
Dried grapes	80620	8000	435.30	1455390	38.05	-	9.90	No	-
Persimmons	81070	(7807 T)	452.48	136297	2.56	7140.833	4.90	No	-
Cauliflower & Broccoli	70410	(13000 T)	717.88	37738	22.61	9.909	0.15	No	-
Nuts	802	18000	604.81	495257	30.16	0.0105	-	Yes	SAPecan & SAMGA
Carrots	70610	4211	664.42	125701	21.02	2135.113	1.38	No	-
Cabbage	70490	4897	751.51	32609	19.97	95.081	0.46	No	-
Pomegranate	8109090	905.62939	798.63	520846	33.70	5545.4384	2.63	Yes	POMASA
Guava	8045010	(31835 T)	809.24	69849	67.76	2.613	0.78	No	-
Lemon & Lime	80550	8262	986.36	3882944	32.13	173306.56	17.69	Yes	CGA
Naartjies	80520	9335	3052.54	2773148	30.44	130923.19	6.67	Yes	CGA
Apricot	80910	2888	3187.80	88710	2.82	83.55772	3.36	Yes	Hortgro
Oats	100400	(33000 T)	4210.91	0	-	-	-	No	-
Onions	70310	9031	4720.63	480015	19.86	563.462	1.95	No	-

Plums	80940	5205	5752.51	1191706	17.33	47319.486	29.69	Yes	Hortgro
Olives: Oil	1509	8000	6165.04	312839	12.76	-	-0.36	Yes	OliveSA
Olives: Table	71120			1891	-7.00	-	-0.04	Yes	OliveSA
Potatoes	70190	60000	6710.40	616151	15.94	2350.866	3.10	Yes	PotatoSA
Oranges	80510	42986	7620.87	8810643	15.62	633365.18	32.06	Yes	CGA
Peaches & Nectarines	80930	9663	9428.97	446073	18.76	6636.947	3.11	Yes	Hortgro
Triticale	100860	(270000 T)	9284.52	0	-	-	0.00	No	-
Pear	80830	12697	11089.79	2783100	20.41	167501.32	15.24	Yes	Hortgro
Table grapes	80610	26391	12684.64	6389478	15.60	271945.93	13.49	Yes	SATI
Apple	80810	23625	21038.31	5257669	18.74	293761.96	10.20	Yes	Hortgro
Rooibos	121299	36034	36033.99	759146	29.40	-	8.82	No	SA Rooibos Council
Barley	100310	93730	70279.82	1290	24.79	-	0.22	Yes	Winter Cereal Trust
Canola	120590	78050	71896.28	161	-18.69	-	-0.27	No	GrainSA
Wine grapes	2204	1.5 mill ltrs	108042.39	413479	21.39	16478.953	4.32	Yes	Vinpro
Wheat	100199	482150	312492.73	239077	-22.09	0	-2.12	Yes	Winter Cereal Trust
Lucerne, Medic									National Lucern
Lupines	121490	-	437321.62	28520	41.47	-	0.94	Yes	Trust
Roses	60311	-	3.74	20928	14.64		0.07	No	Saflowers
Proteas	60319	-	1795.32	12487	2.82		0.07	Yes	SAFEC; SAFGA
Pincushions	60319	175	17.46	12487	2.82	3851	1.10	Yes	Cape Flora SA; SAFEC

Source: Own Compilation from ITC, 2016; PPECB, 2015; Flyover, 2013; NAMC, various; BFAP, 2016; DAFF, various

5. Bibliography

BFAP, 2017. *Competing in a changing global environment: The competitive performance of the South African agricultural sector*. Stellenbosch: Bureau for Food and Agricultural Policy.

Blench, R., 1997. Neglected species, livelihoods and biodiversity in difficult areas: how should the public sector respond? *Natural Resource Perspectives*, 23.

Coetzee, C., 2014. *Province offers R3m for research into smaller crop markets*. Cape Times.

DAFF, 2010. *Registration Guidelines for Minor uses (Minor crops) in South Africa*. Pretoria: Department of Agriculture, Forestry and Fisheries.

DAFF, 2017. *Monthly Fresh Produce Statistics per Municipal Market*. Pretoria: Statistics and Economic Analysis Directorate Department of Agriculture, Forestry and Fisheries.

DAFF, Various. *Market value chains profiles of selected crops*. Pretoria: Department of Agriculture, forestry and fisheries.

Grauerholz, L. & Owens, N., 2015. Alternative Food Movements. *International Encyclopedia of the Social & Behavioral Sciences*, (2), pp.566-72.

Hobby Farms, 2009. *Niche crops help smallfarms thrive*. [Online] Available at: http://hobbyfarms.com/niche-crops-help-small-farms-thrive [Accessed 17 February 2017].

Hortgro, 2017. *Berry Industry Overview*. Presentation. Paarl: Hortgro.

Isleib, J., 2012. *Exploring alternative field crops: Michigan State University Extension*. [Online] Available at: http://msue.anr.msu.edu/news/exploring_alternative_field_crops [Accessed 16 February 2017].

ITC, 2015. *Trademap: Trade Statistics for International Business Development*. [Online] Available at: http://www.trademap.org/ [Accessed 24 November 2015].

Kaiser, 2011. *Rooibos and honeybush tea value chain market development programme*. Cape Town: Western Cape Department of Economic Development and Tourism Kaiser Economic Development Partners.

Kaiser, 2015a. *Natural products industry development initiative*. Elsenburg: Kaiser Economic Development Partners.

Kaiser, 2015b. *Alternative Products Study*. Elsenburg: Casidra Kaiser Economic Development Partners.

Karsen, P., 2017. *Crop Definitions*. Email correspondance: pippak@elsenbur.com. Elsenburg.

University of Kentucky, 2011. *Glossary of alternative farming production and marketing terms*. University of Kentucky.

Kim, B. et al., 2012. Residual determination of clothianidin and its metabolites in the three minor crops via tandem mass spectrometry. *Food Chemistry*, 131(4), pp.1546-51.

McCorkle, D. & Anderson, D., 2009. *Risk Management: Niche Marketing*. Texas: Texas A&M System AgriLife Extension.

MDAC, 2017. *Defining of Speciality Crops*. [Online] Available at: http://www.mdac.ms.gov/bureas-departments/market-development/speciality-crop-block-grant-program [Accessed 16 February 2017].

NAMC, 2016. *Status Report on Statutory Measures inplemented in terms of the Marketing of Agricultural Products Act, Act no. 47 of 1996: 2016 Survey*. Pertoria: National Agricultural Marketing Council.

ODI, 1997. Neglected species, livelihoods and biodiversity in difficult areas: How should the public sector respong. *ODI Natural Resource Perspective*, 23.

OECD, 2009. *OECD Guidance document on defining minor uses of pesticides*. Envirionment, Health and Safety Division.

Paggi, M., 2016. The use of crop insurance in speciality crop agriculture. *Choices*, 31(3), pp.1-6.

PPECB, 2015. *International Trade data*. Cape Town: Perishable Export Control Board.

Trautmann, I., 2014. R3 million fund boosts alternative crops research. *Agriprobe*, 11(4), pp.40-41.

Troskie, D., 2014. Smaller industries: achieving private and public objectives. *AgriProbe*, 11(4), pp.53-56.

USDA, 2017. *Agricultural Marketing Service: Specialty Crop Block Grant Program*. [Online] Available at: https://www.ams.usda.gov/services/grants/scbgp [Accessed 10 April 2017].

WCDoA, 2015. *Flyover GIS Information*. Elsenburg: Western Cape Department of Agriculture.

WCG, 2015. *Strategic Plan 2015/2016 - 2020/2021*. Elsenburg: Western Cape Department of Agriculture.