3R Kenya Issue Brief 001

Targeting medium-sized commercial family farms: A pathway for development

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Introduction

Why would agricultural development benefit from a focus on medium-sized commercial family farms instead of on smallholder farms? That is the question explored in this brief. With their entrepreneurial attitude, this group of farmers is assumed to have significant potential:

- for intensive farming
- willingness to invest in mechanisation
- to adopt good agricultural practices.

Recent thinking that has been very influential in shaping the projects funded under the Food and Nutrition Security Programme of the Embassy of the Kingdom of the Netherlands (EKN) in Nairobi is shown in the following quote:

> Agricultural development programmes have too long focused on semi-subsistence smallholders in an effort to achieve food security. We have to aim instead for an agricultural sector based on medium-sized, mixed family farms that contribute to the African green revolution, sorely needed to feed the future. (Leenstra, 2015)

Four assumptions underlie this support for medium-sized commercial family farms:

#1: Poor and vulnerable smallholder farmers will not feed the world

#2: Large-scale corporate farming will not save us either

#3: Medium-sized (mixed) family farms are sustainable entrepreneurial food security agents

#4: Growth and development moves down the social ladder from those who are better off to those who are moreneedy, according to the trickle-down theory introduced by Aghion and Bolton (1997).

In this brief, we explore the validity of these assumptions, define 'medium-sized commercial family farm' as it applies to the three sectors of the 3R project (aquaculture, horticulture and dairy).

1. Medium-sized commercial family farms: a contested definition

Medium-sized commercial family farms can be thought of in terms of the following three elements:

- size
- commercial orientation
- labour source and succession.

These elements are not necessarily interconnected; for example, a medium-sized farm is not necessarily more commercial than smaller farms.

Size of farm

Farms are commonly categorized on the basis of the **size of the landholding**, that is, small is less than 5 ha, and medium is between 5 and 100 ha (Lowder et al., 2016). Depending on the sector, farm size can also be expressed in other units such as number of ponds in aquaculture and number of lactating cows in dairy (see Table 1 below).

But a categorization based on landholding depends highly on the context such as country, region and the type of farm. What is medium sized in one country can be either small or large in another country. For example, in Kenya, based on the last available results of the Kenya Integrated Household Budget Survey in 2005 the average farm size for all type of farms was 0.86 ha, and a small farm was just over half a hectare (FAO, 2014; Rapsomanikis, 2015; Table 1). If farms are categorized purely by landholding, then 80% of all farms in Kenya are 'small'.

Categorizing farms by their size alone, however, does not tell us much about the farm itself. For example, it does not describe the **resources** available that are prerequisites for successful farming, such as finance, knowledge, markets, technology, networks and linkages to satellite farmers. Resource poor farmers, often with smaller farms have challenges such as getting access to credit, markets and knowledge because these products are often aimed at larger farms. This hampers the transition of small farms to commercial farming (FAO, 2014). The **management of the farm**, either intensive or extensive, is independent of size of the landholding. **Intensification,** which in this context means increasing the productivity of land through increasing inputs, different management practices or a shift to an increased high-value system (higher yielding varieties/breeds, different crops/livestock produce) is often promoted as a pathway to food security as well as increased income. The decrease in land size observed in Kenya has been accompanied by an intensification of land use resulting in an increase in the net value of the crop or livestock produce per hectare, but also in less sustainable land management practices (Muyanga and Jayne, 2014). Another study in Kenya showed that intensification, both for crops and livestock, only resulted in slightly improved food security, mainly for the households that already had adequate food availability. The food-insecure households did not benefit from this intensification but did so from a third option: increasing their off-farm income (Ritzema et

al., 2017). Sustainable intensification might be beneficial for smallholder farmers in some instances; however, for many smallholders, adopting technologies with uncertain outcomes equates to high risks and leads to only a marginal rate of return on investment (Verkaart, 2018).

Farm size can also be defined according to the amount of cropland required to earn **a living income** (SDG1). This substantially increases the required land. For example, in maize-based farming systems in Nyando, the average farm size is 1.5 ha; with current yields (all crops grown) this needs to increase to 3 ha for farmers to earn enough income to reach the poverty line ($1.90/pp/day) and 8 ha for them to earn a living income (Marinus et al., unpub.; Giller et al., 2017). Even under an optimistic intensification scenario, based on current farm activities this would require 2 and 5 ha respectively. Given that the current trend is for farm sizes to decrease, most farmers will be unable to achieve this.

In most emerging economies (or low and middle-income countries) the number of medium-sized farms is increasing, but in Kenya, as mentioned above, landholding sizes are decreasing due to an increase in the rural population (Muyanga and Jayne, 2014; Jayne et al., 2016). However, observations by the 3R team indicate that the number of medium-sized farms is increasing for the horticulture, dairy and aquaculture sectors. This is most likely due to the potential commercial nature of these sectors compared to, for instance, farms focusing on staple crops such as maize.

Table 1. Farm size and number of holdings in Kenya in 2005

	Smaller farm	Other farm[1]	Nationally
Average farm size (ha)	0.53	2.25	0.86
Minimum farm size (ha)	0.04	1.25	0.04
Maximum farm size (ha)	1.21	8.9	8.9[2]
Total number of holdings	3,615,094	854,400	4,469,494

[1] The farm size used here is determined by ordering farms from smallest to largest and choosing the farm size in the middle as the threshold to identify smallholders and other farmers. This means that half of the total land is cultivated by smallholders, and the other half by other farmers.

[2] The maximum farm size of 8.9 ha must be an anomaly of the sample, since there are farms much larger than this in Kenya.

Source: FAO (2014)

Commercial orientation

Commercial farming is in general accepted to encompass when a farm produces crops and livestock for sale, with the intention of making a profit. . Under this definition, few farms in Kenya qualify as purely commercial farms. Most farms are 'mixed', whereby production has multiple purposes and markets; farmers use some of their produce for their own food security and sell the surplus either locally or for export (the latter specifically for perennials and horticulture produce). It is often the ability of the farmer that determines whether a farm becomes commercial; sound management practices are important, but entrepreneurship is the key to making a business out of farming.

The box below illustrates an EKN-funded project that targets mainly medium-sized farmers, with some degree of commercial enterprise.

An increasing trend in commercial farming in Kenya is the rise of the domestic investor farmer, also referred to as 'telephone farmer', that is, farmers who live and work in an urban setting but manage their rural farms using telephone and internet technologies (Leenstra, 2014; see box on the

> The **Unlocking Agriculture Potential through Medium Sized Farms in Kenya** project, run by the Equity Group Foundation, targeted about 2000 medium-size farms of between 2 and 40 ha with the aim of increasing their production and income. Nearly all the farmers have mixed enterprises. One of the findings of the project was that the bulk of medium size farms lack access to affordable credit. Some of the barriers of access to sufficient loans include; some are intimidated by the collateral requirements, can only access a limited amount or find loans too expensive (EGF, 2017).http://equitygroupfoundation.com/our_pillars_program/agripreneurs/

Agricultural Entrepreneurship Incubator Project). In Kenya, urban households own 32% of the medium-sized farms (Jayne et al., 2016). Land is often purchased through money earned from non-farming activities. The consequences of this trend are that investor farmers use

> **Agricultural Entrepreneurship Incubator Project** – The goal of the project, implemented by Latia Resource Center and also known as the 'telephone farmers' project, is 'to develop a business incubation model to be used in unlocking the potential of small and medium-sized commercial farms who in Africa have a huge potential to revolutionize agriculture'. The targets are the agripreneurs agripreneurs who own farms but who do not farm them themselves. Lessons from the project are that it is difficult to turn around an SME because of family dynamics around investments that pay for incubator services; that medium size (2–4 ha) landholdings and relatively younger investors have more potential; and that paying for services makes people more likely to take up the advice given (pers. comm. Kilelu,C., & Opola, F. unpub.) http://www.latiaagribusinesssolutions.com

increased inputs and mechanisation for more intensive and efficient farming. However, this demand results in land scarcity and therefore higher land prices for rural households, and shifting governance structures.

Labour source and succession

Two aspects of the family farm, labour and succession, are the main criteria defining a family farm independent of farm size and level of intensification (van Vliet et al., 2015). On a family farm, most agricultural work is done by the family (FAO, 2014). The majority of farms in Kenya can be classified as family farms; however, many farms hire outside labour for all or part of the year. The aspect of inheritance generally causes a decline in the size of the landholding as farms are split between children; this is the case in Kenya (Muyanga and Jayne, 2014).

The distinction between a family farm and other farms does not give any indication of a farm's economic success or environmental sustainability. Access to resources and off-farm employment are the most important factors for an economically viable farm (van Vliet et al., 2015).

Rural worlds and trickle down

An alternative way of looking at rural communities is the classification based on 'rural worlds' as introduced by the OECD (OECD DAC, 2010).

Rural World 1: large-scale commercial agricultural households and enterprises

Rural World 2: traditional landholders and enterprises, not internationally competitive

Rural World 3: subsistence agricultural households and microenterprises

Rural World 4: landless rural households and microenterprises

Rural World 5: chronically poor rural households, many no longer economically active.

Over 80% of households are only minimally connected to markets (RW5, RW4, RW3); 15% do have some market linkages (RW2), and about 5% can be classified as commercial farmers (RW1). In the ideal situation, households 'step up' this ladder of rural worlds; however, many are 'hanging in', and some are 'stepping out' (Dorward, 2009). The trickle-down theory is often given as an explanation of how people can move up to higher rural world levels (Figure 1).

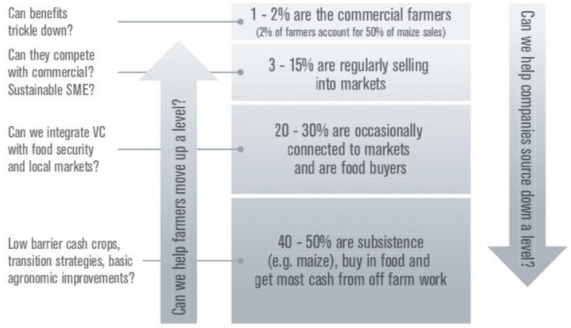

Figure 1. Participation of types of farmers in markets (source: Seville et al., 2011)

2. Medium-sized commercial family farms in three sectors in Kenya

In this section, we describe what types of farms can be distinguished in the aquaculture, dairy and horticulture sectors, on which the 3R project focuses. Each sector classifies farm sizes using different units. We summarise these specifications based on specific studies in 3R, complemented by available studies from other projects (see Table 2). In aquaculture and dairy, the size and commercial orientation of the feed manufacturers is important, as well as the size of farm production.

> The **Kenya Market-Led Aquaculture Project** (KMAP) aims to contribute to a vibrant aquaculture industry that generates sustainable incomes, food security, and employment. The target group of this project, managed by Farm Africa, are interested medium- to large-scale fish farmers, hatcheries and fish feed producers who own at least three active ponds and have resources available to invest. The baseline survey of 221 enterprises showed that the average area for the ponds is around 1,850 m^2, with most farmers owning 3–6 ponds. Those farms with cumulative pond size less than 1,200 m^2 were classified as small farms, those between 1,201 and 3,000 m^2 as medium sized, and the large farms had cumulative pond sizes greater than 3,000 m^2. More than half the farmers were classified as small scale, just under 30% as medium scale and the remainder were large scale. (https://www.farmafrica.org/kenya/fish-farming-in-Kenya)

Aquaculture sector

The stocking density and quality of fingerlings and feed dictate whether farming will be small scale, medium scale or large scale. Most smallholder fish farming in Kenya uses 200–500 m^2 (0.02–0.05 ha) fishponds with a stocking density of 2–3 fish/m^2 (sometimes up to 5 fish/m^2). However, it has been established that fish farming only becomes economical if fish are raised in 600 m^2 fishponds (especially when using borrowed cash/credit) (Obwanga et al., 2017).

The number of entrepreneurs at the production side of the supply chain has increased, as has production: there were 7,800 entrepreneurs in 2007 and around 20,000 in 2011; Kenyan aquaculture production has increased from 4,252 MT in 2007 to 23,501 MT by 2013 (Obwanga et al., 2017). However, since 2011 the number of entrepreneurs has stabilized due to, for example, reduction of subsidies. Initiatives like the Economic Stimulus Package point to a need for a mindset shift towards medium scale, which incorporates embracing technology in production and use of quality feed and seed. Also, there are limited entrepreneurial, management and applied knowledge and skills, which are needed to sustain aquaculture in the long term. This is limiting potential for the sector to grow a robust supply chain.

Table 2. Farm types in aquaculture, dairy and horticulture in Kenya

Type of farm	Aquaculture[1]		Dairy[2]		Horticulture[3]	Focus of the farm
	# units (ponds)	Production (avg tonnage)	# lactating cows[4]	Production (L day^{-1})	Size of landholding	
Mainly subsistence	1	10 t	1–2 cross breeds	5–10	home garden	Mainly household consumption, but at times all produce is sold to generate the necessary cash; mixed farms
Smallholder	2–10	50 t	3–15	10–30	n.a.[5]	Typically a family-run farm with low to moderate input levels and limited external labour
Medium	10-20	100 t	15–40	30–500	n.a.	Either family or commercially run, with moderate to high input and management levels and some external labour
Large	>20	500 t	40+	300+	n.a.	A farm mainly producing for the (export) market with multiple units; a high level of management and inputs and possibly also mechanisation; an external labour force and financial planning

[1] Information based on Golder et al. (2016) and input from Peter van der Heiden and Benson Obwanga
[2] Information based on Rademaker et al. (2016), input from Jan van der Lee
[3] Information based on Gema et al. (2018) and input from Joyce Gema
[4] The landholding of a dairy farm is on average 1 acre per lactating cow
[5] n.a. – not applicable – horticulture is a very diverse sector; depending on the crop and the growing system, what qualifies as small, medium and large change.

A shift towards medium-sized production in aquaculture should shift the mindset from one where farmers rely on subsidies, which has characterised the Kenyan aquaculture sector, to one where farmers access credit to invest in their ventures, which ensures commitment to production and therefore profits from fish farming, as is the focus in the Kenya Market-Led Aquaculture Project (see box).

Dairy sector

For the dairy sector, the number of lactating cows and the amount of land are the determinants of farm size. In the Kenyan highlands, on average one lactating cow equates to one acre of farm land, of which part is devoted to grazing or fodder crops. Dairy production in Kenya is done by a mix of small-, medium- and large-sized farms (current numbers not known). Medium- and large-sized farms often sell and deliver milk directly to the market (processors, end consumers) and are usually not part of the smallholder dairy value chain, which is anchored around dairy farmers cooperative societies. KMDP (see box below) supports this segment of farmers because of their growth potential and importance for spurring sector transformation (Ettema, 2015). This involves supporting the transitioning of the sector from (mixed) smallholder dairy farming to medium-scale dairy farms. Some have evolved out of entrepreneurial smallholdings, with dairy as the core business. These emerging farmers usually have resources (inherited land, capital from business or employment) and are willing to invest in expansion and improvement (e.g. breeds, cow housing, training of farm managers, on-farm (mechanized) fodder production and preservation, and feed rationing). They can fast track the development of a professional dairy support infrastructure that – once in place – will also benefit the smallholder supply chain. Through their networks, these farmers can also push for policy reforms that will benefit the dairy sector as a whole. By increasing their use of external inputs and services, entrepreneurial dairy farmers create demand these kinds of support infrastructure, which offers new employment and business opportunities for youth. Development of support infrastructure is an important focus of sector development, as is improving the reliability of output markets through stronger contracting between farmers, suppliers and processors; more efficient collection networks; and milk quality assurance systems.

> The **Kenya Market-led Dairy Project** (KMDP) contributes to 'the development of a vibrant and competitive private sector–driven dairy sector in Kenya, with beneficiaries across the value chain'. The main target group is smallholder dairy farmers; however, KMDP realized that sector transformation also requires support to commercial (either medium-scale or investor) farmers and fodder producers (Ettema, 2015).

> **HortIMPACT** aims to achieve 'entrepreneurial capacities and performance of small and medium-sized farmers and companies [that are] enhanced for improved market access to domestic and international markets'. The mid-term review suggests that more attention should be given to gender and youth (Motz & Assefa, 2017).

Horticulture sector

In horticulture, the value of crops grown and the investment in infrastructure (e.g. irrigation, greenhouses, pack houses, cold storage) and technology are important determinant factors of whether a farm is commercial or not. The majority of horticulture producers, apart from those mainly growing for household consumption, are in one way or the other commercial farmers. Landholding is not the determiner of success in cultivation of high value horticulture products; rather, the level of intensification and entrepreneurial skills determine the success of a farm. Five ha of land can be sufficient for a vibrant commercial (export) herb farm, while a pineapple farm needs ten times this land. Other examples of high value products include pepper, herbs and spices, Asian vegetables, green beans and peas, Chinese vegetables and some forms of covered horticulture (see Matui et al., 2016).

A survey carried out among approximately 2,000 vegetable farmers (Gema et al., 2018) showed that average landholding was only marginally larger for those who are GlobalGAP certified compared to those who are not (Figure 2). Having GlobalGAP certification is an indication of commercialization, since farmers only seek certification if they can enter the export value chain.

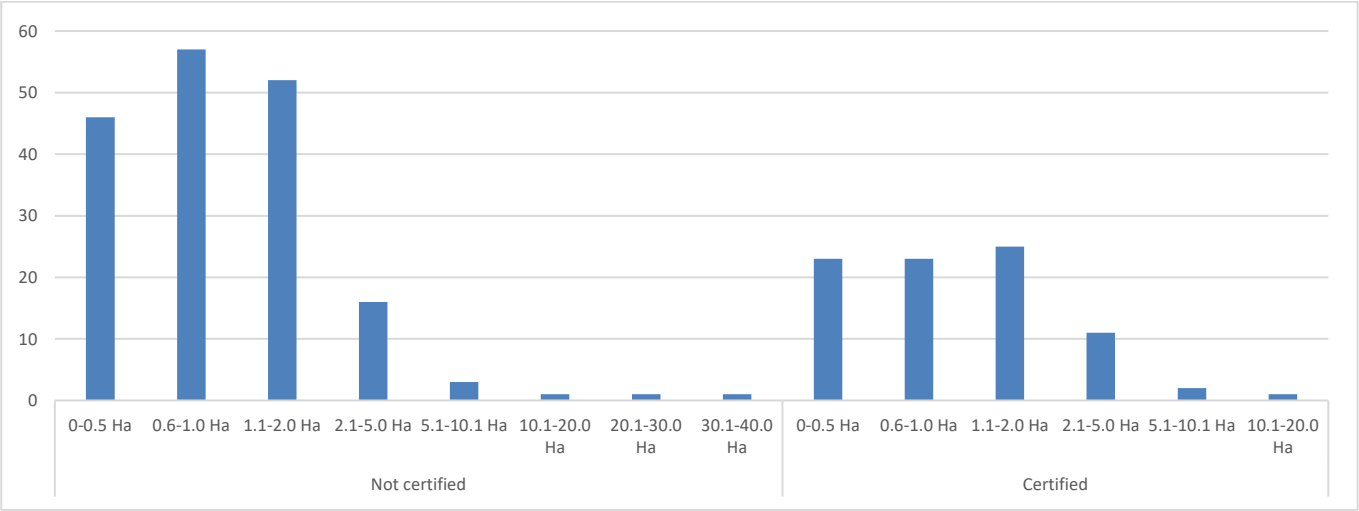

Figure 3. Landholding in hectare for GlobalGap Certified and non-certified vegetable farmers. (Source: Gema et al.(2018)

3. The potential of medium-sized commercial family farms as the main target of the new Multi-Annual Country Strategy

Dutch policy aims to strengthen trade relations with Kenya, so the Dutch government currently supports sector development and growth. It seems that the potential for growth is strongest in the emerging, entrepreneurial, small- and medium-sized farms. From this exploration of the aquaculture, dairy and horticulture sectors, we conclude that whether a farm is a commercial enterprise or not is determined by neither the size of landholding nor whether it is a family farm or not. Rather, a farm has the potential to become a commercial enterprise if its economic size is such that it will generate a living income. The farmer's business acumen, access to resources including affordable credit, and market linkages are important considerations.

Kenyan farmers are, however, still predominantly smallholder famers. Often, most of their income is generated through off-farm activities. Unless alternative livelihoods, such as on-farm job creation, opportunities for value addition of raw agricultural products, and off-farm employment are available for these farmers and their children (youth employment can be one way to minimize out-migration), they will not be able to earn a living income (Marinus et al., unpubl.) through farming alone. Many of these farmers are farming by default, not by choice. So the other question is: If policy only focuses on commercial farmers, what alternatives are there for subsistence and smallholder farmers? Evidence from multiple Agricultural Research for Development projects has shown that the trickle-down effect does not occur without affirmative action (Muñoz, 2009), such as counties actively introducing support and services for the farmers in their constituencies. Introducing smart subsidy programmes can be a way to support emerging smallholder farmers to become commercial farmers.

The Kenya Vision 2030 (GoK, 2015) aims to create an innovative, commercially oriented and modern agriculture, livestock and fisheries sector. The assumption is that this will happen mainly through better yields in key crops, increased smallholder specialization in the cash crop sector, utilization of a million hectares of farm land that is currently not being cultivated, and new cultivation of up to 1.2 million hectares of newly opened lands. However, the vision does not specifically address the question of how to commercialize agriculture and create employment in the farming sector through jobs in the input or processing and marketing sides.

A target group for policy programmes is much easier to delineate by farm size, which is measurable and is provided in all statistics. It's much harder to define the group of people who are serious about farming as a business and are willing to invest. Perhaps requiring co-investments (in-kind, small contributions) from farmers participating in EKN-funded activities and projects could be a way of selecting those people over those who farm by default. However, the latter group still needs a future, an alternative livelihood. Attention needs to be paid to improving market access and off-farm income as a strategy, not just to increasing production (Frelat et al., 2016). Opening up opportunities for young (urban) entrepreneurs in farming, rather than through inheritance of a farm alone, should help to professionalise the three sectors. Investor farmers and their relatively large farms offer another opportunity for job creation.

In the absence of vigorous growth in off-farm employment opportunities, smallholder production systems are important for creating income and employment in rural communities and absorbing rural youth, whether farming is done as a livelihood strategy or as a fully commercial enterprise (Rademaker et al., 2016).

Policy recommendation from *Food for Thought* (IOB, 2017, p. 25)

"Use a differentiated targeting of farmers, anticipating agricultural transformation and rural transition. Some farmers may be helped by enabling them to transition to commercial farming (stepping up). For others it would be better to leave agriculture and to find off-farm employment (stepping out). In addition, policies should also acknowledge that for many others, subsistence farming remains their only livelihood option for the time being (hanging in). For the commercially-oriented farmers, it is important for the focus to be on helping them to be assured of income, but for subsistence farmers, a stronger focus on nutrition will be important. By emphasising commercial agricultural development, the Netherlands tends to address mainly the stepping-up farmers, yet an inclusive policy for development in a broader sense also needs a strategy to address the farmers who are stepping out or hanging in."

3R Kenya Project

The 3R Kenya (Resilient, Robust, Reliable: From Aid to Trade) project is a learning initiative supported under the Agriculture and Food and Nutrition Security (FNS) program of the Embassy of the Kingdom of the Netherlands. 3R Kenya seeks to assess evidence and lessons from FNS and other related programs that support competitive, market-led models in spurring agricultural development. It focuses on the aquaculture, dairy and horticulture sectors. 3R Kenya is running at a time when the Dutch government's bilateral relations in Kenya are transitioning from a focus on aid to trade to enhance the development of agrifood sectors. Through evidence generation and stakeholder dialogue, 3R seeks to contribute to an understanding of effective conditions for sustainable inclusive trade for transforming resilient, robust and reliable agrifood sectors.

References

Aghion, P., Bolton, P. 1997. A theory of trickle-down growth and development. *The Review of Economic Studies*, 64,151–172.

Dorward, A. (2009). Integrating Contested Aspirations, Processes and Policy: Development as Hanging In, Stepping Up and Stepping Out, Development Policy Review, 27: 131-146

EGF 2017. 2016 Annual Report Agriculture Entrepreneurship Accelerator. pp. 63, Nairobi.

Ettema, F. 2015. Status report: Medium scale farmers (MSFs) and commercial fodder producers (CFPs) agenda (including PUM evaluation 2015). Leeuwarden.

FAO—Food and Agriculture Organization of the United Nations. 2014. Family Farming Knowledge Platform. http://www.fao.org/family-farming/data-sources/dataportrait/country-details/en/?cnt=KEN.

Frelat, R., Lopez-Ridaura, S., Giller, K.E., Herrero, M., Douxchamps, S., Djurfeldt, A.A., Erenstein, O., Henderson, B., Kassie, M., Paul, B., Rigolot, C., Ritzema, R.S., Rodriguez, D., van Asten, P.J.A., van Wijk, M.T. 2016. Drivers of household food availability in sub-Saharan Africa based on big data from small farms. *Proceedings of the National Academy of Sciences*, 113, 458–463.

Gema, J., Saavedra, Y., Keige, J., Koomen, I. (2018) A survey of food safety practices and perceptions in the vegetable sector in Kenya. Wageningen University & Research, 3R Kenya, Wageningen.

Giller, K., Marinus, W., de Valença, A., Thuijsman, E., van de Ven, G., Descheemaeker, K., van Ittersum, M., Vanlauwe, B., Baijukya, F., van Wijk, M. 2017. The future of farming – who will produce our food? Presentation 3rd Global Food Security Conference, Cape Town. 2017.

Golder Associates. 2016. Strategic Environmental Assessment and Environmental Management Plan KMAP. Nairobi report no. 1655589-306435-1.

IOB. 2017. Food for thought – Review of Dutch food security policy 2012–2016. IOB Evaluation nr. 419. The Hague.

Jayne, T.S., Chamberlin, J., Traub, L., Sitko, N., Muyanga, M., Yeboah, F.K., Anseeuw, W., Chapoto, A., Wineman, A., Nkonde, C., Kachule, R. 2016. Africa's changing farm size distribution patterns: the rise of medium-scale farms. *Agricultural Economics*, 47, 197–214.

Leenstra, M. 2014. From suitcase farmers to telephone farmers – Agriculture and diversified livelihoods among urban professionals. In Digging Deeper: Inside Africa's Agricultural, Food and Nutrition Dynamics. Eds. Akinyoade, A., Wijnand Klaver, W., Sebastiaan Soeters, S., Foeken, D. pp. 217–231.

Leenstra, M. 2015. Medium-sized, mixed family farms to feed the future: A vision for farming in Africa. The Broker Blog. http://www.thebrokeronline.eu/Blogs/Food-Security-blog/Medium-sized-mixed-family-farms-to-feed-the-future-A-vision-for-farming-in-Africa.

Lowder, S.K., Skoet, J., Raney, T. 2016. The number, size, and distribution of farms, smallholder farms, and family farms worldwide. *World Development*, 87, 16–29.

Marinus, W. unpub. Data on living income in Kenya and Tanzania. Wageningen University & Research.

Matui, M.S., Saavedra Gonzalez, Y., Gema, J., Koomen, I. 2016. From aid to sustainable trade: driving competitive horticulture sector development. A quick scan of the horticulture sector. Wageningen Centre for Development Innovation, Wageningen University & Research. Report 3RKenya-16-03/CDI-16-045. Wageningen.

Motz, M., Assefa, S. (2017) Mid-term review of the Kenya Market-led Horticulture Program (HortIMPACT) pp. 50 Fair & Sustainable Consulting

Muñoz, L. (2009) How Do Agricultural Development Benefits Actually Spread: Is it the Trickle Down Effect or the Embudo Effect?, In: Environment and Society, Special Edition 372, January 8, ECOPORTAL, Buenos Aires, Argentina

Muyanga, M., Jayne, T.S. 2014. Effects of rising rural population density on smallholder agriculture in Kenya. *Food Policy*, 48, 98–113.

Obwanga, B., Kilelu, C., Bolman, B.C. (Eds.) (2016). From aid to sustainable trade: driving competitive aquaculture sector development. A quick scan of the aquaculture sector in Kenya. Wageningen University & Research, 3R, Kenya. Wageningen.

OECD DAC—Organisation for Economic Co-operation and Development's Development Assistance Committee. 2010. Aid in support of gender equality and women's empowerment. Creditor Reporting System database. www.oecd.org/dataoecd/7/55/38898309.pdf.

Rademaker, I.F., Koech., R.K., Jansen, A., van der Lee, J. 2015. Smallholder Dairy Value Chain Interventions; the Kenya Market-led Dairy Programme (KMDP) – Status Report. Wageningen Centre for Development Innovation, Wageningen University & Research. Report CDI-16-018. Wageningen.

Rademaker, C.J., Bebe, B.O., van der Lee, J., Kilelu, C., Tonui, C. 2016. Sustainable growth of the Kenyan dairy sector; A quick scan of robustness, reliability and resilience. Wageningen Centre for Development Innovation, Wageningen University & Research. Report 3R Kenya/WLR 979. Wageningen.

Rapsomanikis, R. 2015. The economic lives of smallholder farmers – An analysis based on household data from nine countries. FAO, Rome.

Ritzema, R.S., Frelat, R., Douxchamps, S., Silvestri, S., Rufino, M.C., Herrero, M., Giller, K.E., López-Ridaura, S., Teufel, N., Paul, B.K., van Wijk, M.T. 2017. Is production intensification likely to make farm households food-adequate? A simple food availability analysis across smallholder farming systems from East and West Africa. *Food Security*, 9(1), 115–131.

Seville, D., Buxton, A., Vorley, B. 2011. Under what conditions are value chains effective tools for pro-poor development? A report for the Ford Foundation. International Institute for Environment and Development/Sustainable Food Lab.

Verkaart, S. (2018) Poor farmers - Agricultural innovation and poverty reduction in Ethiopia and Kenya. pp. 151, PhD thesis, Wageningen University, Wageningen, the Netherlands

van Vliet, J.A., Schut, A.G.T., Reidsma, P., Descheemaeker, K., Slingerland, M., van de Ven, G.W.J., Giller, K.E. 2015. De-mystifying family farming: Features, diversity and trends across the globe. *Global Food Security*, 5, 11–18.

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Acknowledgements

The 3R Kenya project is funded by the Embassy of the Kingdom of the Netherlands in Nairobi, Kenya, within the framework of the Agriculture and Food & Nutrition Security program.

This brief is based on desk review and synthesis of selected literature and expert views related to the topic. The review was undertaken to feed into EKN's Multi-Annual Country Strategy (MACS) development process.

Please cite this brief as: Koomen, I., van der Lee, J., Obwanga, B. and Coninx, I. (2018). Targeting medium-sized commercial family farms: A pathway for development. 3R Kenya Project Issue Brief 001. Wageningen University and Research.

The brief is available at http://www.3r-kenya.org/

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