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Foundation for World
Agriculture and Rurality

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# Developing a typology of agricultural holdings for improved policy design: a preliminary case study of Malawi

In partnership with

**WAW**
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# Content disclaimer

# Résumé exécutif

Au Malawi, la majorité de la population dépend de l'agriculture et les exploitants agricoles sont considérés comme de "petits agriculteurs". Mieux caractériser la diversité des exploitations agricoles et les facteurs de leurs transformations est essentiel pour informer les décideurs politiques et adapter les politiques publiques, dès leur conception, à la diversité des besoins et des capacités des ménages.

Le World Agriculture Watch (WAW, Observatoire des Agricultures du Monde) a été créé récemment sous l'égide de plusieurs institutions (la FAO, le FIDA, le gouvernement français et le Cirad). Le but du WAW est d'établir un dialogue politique inclusif sur la diversité des systèmes agricoles, les changements structurels qu'ils subissent et les impacts qu'ils produisent. La première étape de WAW est de proposer un cadre conceptuel original fondé sur une approche systémique et une méthodologie commune pour caractériser les exploitations agricoles. Le WAW a lancé en février 2013 un travail exploratoire participatif dans le but de réviser le cadre conceptuel de la typologie internationale qu'il a définie (WAW 2012), puis de tester ce cadre conceptuel sur plusieurs études de cas. Cette étude sur le Malawi vient compléter les autres études de cas proposées par le WAW.

Le but de ce rapport est de fournir une typologie préliminaire des exploitations agricoles au Malawi. Cette première typologie vise à tester l'intérêt des chercheurs et des décideurs politiques pour ce type de travail, les sensibiliser à son utilité, affiner leur compréhension analytique de la diversité des ménages agricoles et renforcer leur capacité de plaidoyer pour sa prise en compte dans les politiques.

Les objectifs spécifiques de ce rapport sont de contribuer à la réflexion sur la méthodologie internationale du WAW, ainsi qu'aux débats de politique intérieure au Malawi.

Dans cette optique, un nombre restreint de types d'exploitations agricoles sont proposés. Cette classification est préliminaire et doit être enrichie grâce à des analyses statistiques plus poussées de la base de données utilisée, des consultations avec les acteurs locaux et des enquêtes de terrain au Malawi.

## Principal résultat : vers une typologie préliminaire

Nous nous sommes appuyés sur la base de données ménages la plus récente pour le Malawi, la Third Integrated Household Survey, IHS3 (Troisième enquête ménage), datant de 2010. Nous avons commencé par y chercher les données disponibles pour chacun des trois indicateurs de la méthodologie internationale du WAW, à savoir, l'utilisation de la main d'œuvre sur l'exploitation (familiale ou employée), le management (le capital détenu provient d'un membre du ménage ou bien d'un membre externe à celui-ci) et la commercialisation (ici, l'orientation de la production de l'exploitation : vers l'autosubsistance ou vers le marché). Les données, les choix sur les critères à utiliser et leurs limites sont présentés synthétiquement dans le tableau ci-après.

**Tableau 1 : Critères WAW et utilisation des données de l'IHS3**

| | Données | Critère utilisé | Limites |
|---|---|---|---|
| Travail | Les données sur le travail sont exprimées en jours, par saison agricole (humide et sèche), et en fonction du type de main d'œuvre : membres du ménage, main d'œuvre « gratuite/échangée » ou employée (nb : les membres du ménage n'impliquent pas toujours une affiliation, ce sont les membres vivant au sein du ménage) | Exploitations n'utilisant que de la main d'œuvre familiale (du ménage) et gratuite. Exploitations avec moins de 50 % de main d'œuvre employée. Exploitations avec 50 % ou plus de main d'œuvre employée. Exploitations avec uniquement de la main d'œuvre employée | Nous avons associé la main d'œuvre gratuite à la main d'œuvre familiale, mais ce choix est discutable. La main d'œuvre salariée temporaire n'est pas distinguée de la d'œuvre permanente ; nous avons donc utilisé le seuil (arbitraire) de 50 % de main d'œuvre employée. La saisonnalité dans l'utilisation de la main d'œuvre n'est pas prise en compte, or uniquement 12 % des exploitations cultivent durant la saison sèche. Pas d'exploitations capitalistiques[1]. |
| Management | Deux sortes de données : (i) le statut de la terre (propriétaire ou loueur/métayer) et (ii) les membres qui prennent des décisions sur les parcelles en propriété, par culture. | Le statut de la terre a été utilisé puis croisé avec la prise de décision de production pour tester si la prise de décision pouvait aider à mieux distinguer le type de management. | Les grands domaines agricoles (*estates*) semblent absents des données : c'est logique pour une enquête-ménage, qui diffère en cela d'un recensement agricole. Le test d'une relation entre le statut de la terre et le membre prenant la décision de production ne donne pas de résultats significatifs ➔Ce critère n'a pas été utilisé. |
| Commercialisation | Différents choix possibles, par culture, pour définir l'orientation productive : une question fermée sur la mise en marché, les revenues tirés des ventes et la quantité vendue | Choix d'utiliser la part de la production vendue (en quantité) : deux seuils utilisés, 0 % et le seuil international de 50 %. | Pas d'analyse comparée des orientations productives : certains agriculteurs non "commerciaux" peuvent être amenés à vendre une partie de leur récolte pour gagner de l'argent. Les agriculteurs qui ne vendent pas leur production sont tout de même reliés aux marchés en tant qu'acheteurs d'aliments. D'autres indicateurs d'auto-suffisance alimentaire seraient utiles. |

La figure 1 illustre la façon dont les 12 groupes d'exploitations agricoles ont été formés. Ces groupes ont ensuite été analysés à travers d'autres variables, puis regroupés en une typologie préliminaire avec un nombre de types plus gérable et plus synthétique, qui comprend 5 catégories de fermes.

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[1] Les exploitations tenues par des ménages qui déclarent ne pas avoir recours à de la main-d'œuvre familiale ne sont pas pour autant "capitalistiques" (c'est-à-dire possédées par des actionnaires extérieurs à la famille), puisque ce type d'exploitation agricole ne devrait pas apparaître dans une enquête-ménages.

**Figure 1 : Méthodologie**



MO : main d'œuvre
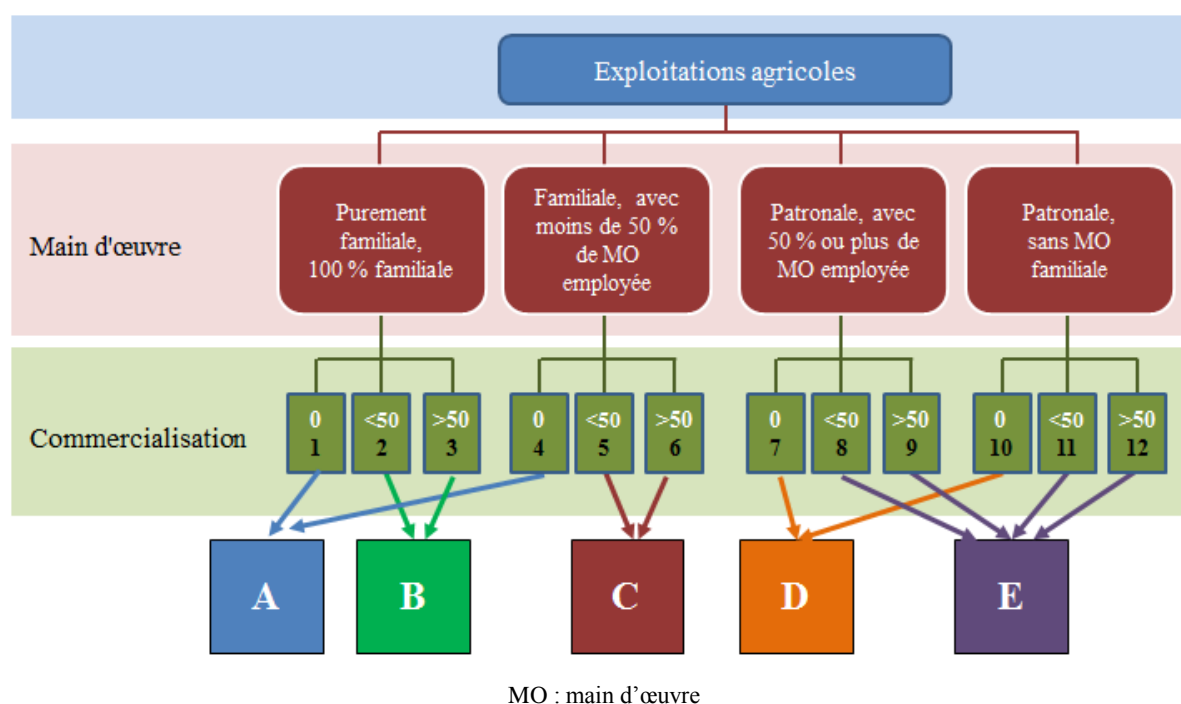
Les 5 types d'exploitations agricoles identifiés dans ce rapport sont:

- les fermes familiales de subsistance (A), qui représentent 53 % du nombre total d'exploitations agricoles ;
- les fermes purement familiales commerciales (B, 30 % des exploitations) ;
- les fermes familiales commerciales, qui utilisent de la main d'œuvre employée (C, 14 % des exploitations)
- les fermes patronales de subsistance (D, 3 % des exploitations) ;
- les fermes patronales commerciales (E, 1 % des exploitations).

Le tableau 2 résume les principales caractéristiques de chaque type d'exploitation. Les fermes familiales de subsistance détiennent 44 % des terres cultivées mais contribuent à hauteur de seulement 26 % de la production. Les fermes patronales commerciales produisent 36 % du total des récoltes, mais ne fournissent que 21 % du travail agricole et ne cultivent que 20 % des surfaces.

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**Tableau 2 : Principales statistiques descriptives issues de la typologie préliminaire des exploitations agricoles au Malawi**

| | | A. Fermes familiales de subsistance | B. Fermes purement familiales commerciales | C. Fermes familiales commerciales | D. Fermes patronales de subsistance | E. Fermes patronales commerciales | Total |
|---|---|---|---|---|---|---|---|
| Nombre d'exploitations | | 5 342 | 3 034 | 1 406 | 266 | 110 | 10 158 |
| Part du total des ménages | | 53 % | 30 % | 14 % | 3 % | 1 % | 100 % |
| Travail familial, jours | Moyenne | 103 | 172 | 197 | 10 | 18 | 133 |
| | Ecart-type | 90 | 132 | 171 | 20 | 31 | 125 |
| Surface cultivée | Surface totale (ha) | 5 337 | 3 931 | 2 376 | 258 | 180 | 12 082 |
| | Part | 44 % | 33 % | 20 % | 2 % | 1 % | 100 % |
| | moyenne/ménage | 1 | 1,3 | 1.69 | 0,97 | 1,63 | 1,19 |
| Production, en millier de tonnes | Total | 2 305 499 | 2 910 739 | 3 244 177 | 294 872 | 246 687 | 9 001 975 |
| | Part | 26 % | 32 % | 36 % | 3 % | 3 % | 100 % |
| | moyenne/ménage | 432 | 959 | 2 307 | 1 109 | 2 243 | 886 |
| Travail agricole, en jours | Total | 527 817 | 497 009 | 279 008 | 11 533 | 8 770 | 1 324 137 |
| | Part | 40 % | 38 % | 21 % | 1 % | 1 % | 1 |
| | moyenne/ménage | 105 | 172 | 212 | 44 | 82 | 138 |
| MO employée, jours | Moyenne | 2 | 0 | 15 | 34 | 64 | 5 |
| | Ecart-type | 9 | 0 | 20 | 52 | 85 | 18 |
| Revenus agricoles | Moyenne (,000 MK) | 2,88 | 26.87 | 65,58 | 1,23 | 102,27 | 19,76 |
| | Ecart-type | 123,33 | 187,24 | 295,3 | 10,99 | 229,35 | 177,86 |
| Revenus hors exploitation | Moyenne (,000 MK) | 44 | 13 | 75 | 746 | 515 | 62 |
| | Ecart-type | 330 | 57 | 325 | 5 771 | 2 464 | 1 011 |
| Taille du ménage | Moyenne | 4,61 | 4,89 | 4,93 | 4,69 | 4,39 | 4.,74 |
| | Ecart-type | 2,22 | 2,17 | 2,19 | 2,03 | 2,21 | 2,2 |
| Membres du ménage travaillant en dehors de l'exploitation | Moyenne | 1,02 | 1,09 | 0,74 | 0,96 | 0,58 | 0,99 |
| | Ecart-type | 1,05 | 1,16 | 0,95 | 0,83 | 0,75 | 1,07 |
| Possession de bétail | Part de ménages | 44 % | 63 % | 73 % | 35 % | 60 % | 54 % |
| Valeur des équipements agricoles | Moyenne (,000 MK) | 3 130 | 3 439 | 9 774 | 3 960 | 13 507 | 4 276 |
| | Ecart-type | 40 231 | 13 260 | 37 359 | 20 570 | 72 264 | 34 202 |
| Valeur des biens durables | Moyenne (,000 MK) | 15.11 | 6,67 | 26,73 | 184,61 | 123,28 | 19,81 |
| | Ecart-type | 86,31 | 17,9 | 102,31 | 424,57 | 291,53 | 109,42 |
| Accès au crédit | Part de ménages | 10 | 14 | 19 | 14 | 16 | 13 |
| Coupons (*) | Part de ménages | 48,32 | 61,24 | 65,5 | 27,82 | 41,82 | 53,95 |
| Bénéficaires d'un filet de sécurité | Part de ménages | 20 % | 16 % | 16 % | 12 % | 11 % | 18 % |

Source: IHS3, calcul des auteurs

(*) Coupons : intrants subventionnés

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## Prochaines étapes recommandées

Cette typologie préliminaire des exploitations agricoles au Malawi est exclusivement basée sur l'analyse de la base de données IHS3 et suit à la lettre la méthodologie internationale du WAW.

Il existe plusieurs limites à ce travail préliminaire. La première est l'absence d'informations sur les grands domaines agricoles. Selon les estimations disponibles, ceux-ci ne représentent que 1 % du nombre total d'exploitations agricoles, mais fournissent environ 30 % de la production agricole (ils sont spécialisés en particulier dans la production de cultures de rente comme le sucre, le thé et le café), détiennent quelque 20 % des terres cultivées et contribuent à hauteur de 40 % au PIB agricole. De fait, cette analyse est plutôt un portrait de l'agriculture familiale qu'une typologie représentative de l'ensemble de l'agriculture au niveau national. La seconde limite tient à la nécessité d'approfondir la typologie et plus spécifiquement à obtenir plus de détails au niveau régional.

Les prochaines étapes recommandées sont les suivantes :

- à court terme, l'analyse statistique de la typologie pourrait être approfondie à partir des données IHS3 existantes et des travaux de recherche déjà réalisés, comme l'étude de très haute qualité sur les zones de moyens de subsistance (*Livelihood Zones*) et les analyses de la pauvreté. La typologie devrait également être régionalisée ;
- à ce stade, il est essentiel que les parties prenantes locales soient consultées, à la fois pour tester la pertinence de la typologie et pour l'enrichir ;
- augmenter la robustesse de la typologie à travers des études de terrain.

Enfin, il serait utile d'accroître la pertinence de la classification des exploitations agricoles pour améliorer les politiques publiques, en travaillant plus étroitement sur les différents programmes destinés aux agriculteurs et leurs critères de ciblage.

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# Executive summary

In Malawi, where most of the population relies on agriculture and is considered "small farmers", better characterizing the diversity of agricultural holdings and the drivers of their transformation is key to inform policy makers and design programs better fitted to the diverse needs and capacities.

The World Agriculture Watch (WAW) was recently set up as a consortium of several institutions (FAO, IFAD, the French Government and Cirad). WAW aims to inform an inclusive policy dialogue on the diversity of agricultural systems, structural changes affecting them and their impacts. The first step of WAW is to propose an original conceptual framework based on a systemic approach and a common methodology to define agricultural holdings. In February 2013, WAW launched a participatory exploratory work to revise WAW Methodological Framework (WAW 2012) and test it on several case studies. This case study on Malawi complements other case studies currently testing the international typology.

The aim of this report is to provide a preliminary typology of agricultural holdings in Malawi that could usefully contribute to raising the interest of researchers and policy makers for analytical understanding and political lobbying on the diversity of farm households. The specific objectives of this report are to contribute to the WAW reflections on the international methodology but also to Malawi internal policy debates.

To do so we provide a small manageable number of household types, which are preliminary for two reasons. The first one is that part of the agricultural holdings of Malawi are not represented in our analysis: large-scale agricultural estates, which are part of the dual agricultural system that Malawi inherited from the colonial administration and perpetuated after independence, are absent from the data we used. Secondly, the household types need to be enriched with further statistical analysis of the existing database, tested with local stakeholder consultations and deepened with field studies in Malawi.

## Main output: towards a preliminary typology of family farming

We relied on the Third Integrated Household Survey of 2010 (IHS3), the latest household survey available of Malawi. We started by looking in IHS3 at the available data for each of the three indicators of the WAW international methodology, concerning respectively the labor used on farm (hired or family farm), the management (whether capital comes from the family or external holders) and the commercialization (i.e. the market orientation, as opposed to the subsistence orientation) of the farm. The data, decisions on the criteria to use and their limitations are presented synthetically in the tables below.

**Table 1: WAW indicators and use with regard to the IHS3 data**

| | Data | Criterion used | Limitations |
|---|---|---|---|
| Labor | Data on labor is given in days, by agricultural season (dry/ rainy). Distinction between household members, free labor and hired labor. (nb: household members do not necessarily are family members, they are members living with the household) | Holdings only using family and free labor. Holdings using under 50% of hired labor. Holdings using more than 50% hired labor. Holdings using only hired labor | The classification of "free" labor is questionable. No criterion to distinguish temporary from permanent labor so questionable 50% of hired labor criterion. Seasonality of labor use not considered: only 12% of households grow crops during the dry season. Household held holdings that do not declare using family labor are not "corporate", as no real corporate farms (owned by private equity) should be present in a typology based on a household survey. |
| Management | Two kind of data: (i) Status of land used (owning or renting) and (ii) the member who makes the decisions on the plots owned | Status on land has been used then crossed with the decision making to test if the decision can help better distinguish the type of management. | Estate agriculture seems to be missing from the data. It makes sense, since the survey is dedicated to households and is not an agricultural census. The results with land status and decision making on plot were not statistically significant. ➔No criterion was used. |
| Commercialization | Different choices were possible, by crop, to define market orientation: a question on whether they are selling, the revenues from sales, and the quantity sold | Choice to use the share of production sold (quantity): two thresholds of 0% and 50% (international threshold). | No cross check so far with production orientation between food and cash crops. Some farmers may sell a small part for liquidity constraints and not being commercial per se. The farmers not selling are still related to the markets as buyers of food. Other indicator of food self sufficiency. |

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Figure 1 illustrates how we ended up with 12 groups. These groups were then analyzed through other descriptive variables, and regrouped to a preliminary typology with a more manageable number of types, comprising 5 categories of agricultural holdings.

**Figure 1: Methodology**
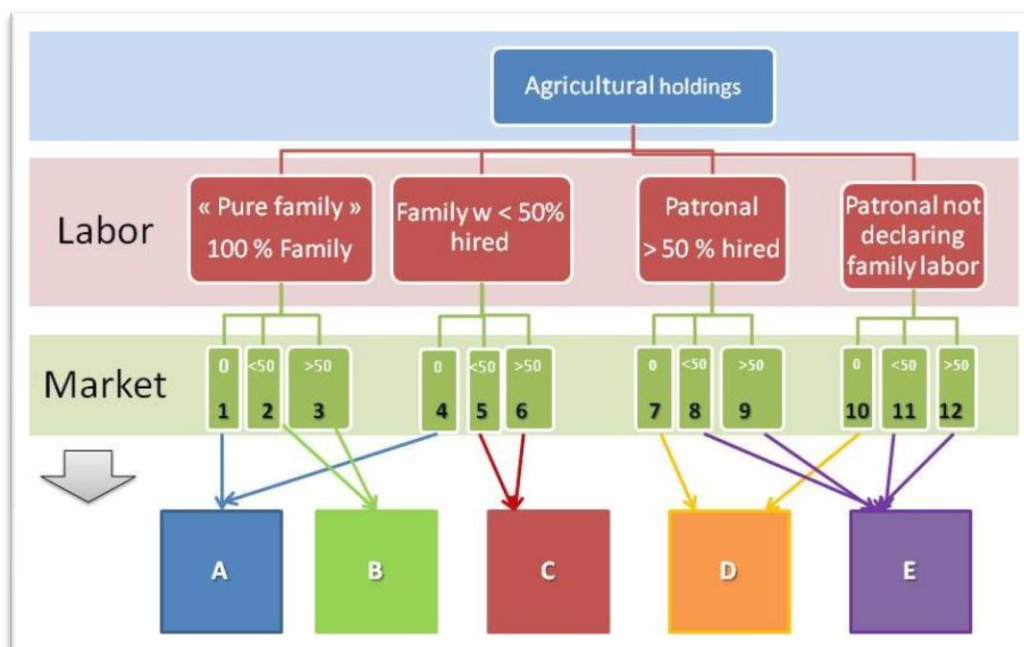


The 5 types of agricultural holdings identified in this report are:

- the **subsistence family farms (A)**, that represent 53% of agricultural holdings;
- the **commercial pure family farms** (**B**, 30% of holdings);
- the **commercial family farms** with hired labor (**C**, 14% of holdings);
- the **subsistence patronal farms** (**D**, 3% of holdings);
- the **commercial patronal farms** (**E**, 1% of holdings).

Table 2 shows the main features of each type of holdings. Subsistence family farms harvest 44% of the cultivated area, but contribute for only 26% to the production harvested. The commercial family farms with hired labor produce 36% of the total crops harvested, but account for only 21% of farm labor and cultivate 20% of agricultural area.

**Table 2: Main descriptive statistics of the preliminary typology of Malawian agricultural holdings**

| | | A. Subsistence family farms | B. Commercial pure family farms | C. Commercial family farms with hired labor | D. Subsistence absentee patronal farms | E. Commercial patronal farms | Total |
|---|---|---|---|---|---|---|---|
| **Number of holdings** | | 5342 | 3034 | 1406 | 266 | 110 | 10158 |
| **Share of total HH** | | 53% | 30% | 14% | 3% | 1% | 100% |
| **Family labor, in days** | Mean | 103 | 172 | 197 | 10 | 18 | 133 |
| | SD | 90 | 132 | 171 | 20 | 31 | 125 |
| **Cultivated land area** | Total area (ha) | 5337 | 3931 | 2376 | 258 | 180 | 12082 |
| | Share | 44% | 33% | 20% | 2% | 1% | 100% |
| | Average /HH | 1 | 1.3 | 1.69 | 0.97 | 1.63 | 1.19 |
| **Harvest, in thousand of Tonnes** | Total | 2305499 | 2910739 | 3244177 | 294872 | 246687 | 9001975 |
| | Share | 26% | 32% | 36% | 3% | 3% | 100% |
| | Average/HH | 432 | 959 | 2307 | 1109 | 2243 | 886 |
| **Labor in agriculture, in days** | Total | 527817 | 497009 | 279008 | 11533 | 8770 | 1324137 |
| | Share | 40% | 38% | 21% | 1% | 1% | 1 |
| | Average /HH | 105 | 172 | 212 | 44 | 82 | 138 |
| **Hired labor in days worked** | Mean | 2 | 0 | 15 | 34 | 64 | 5 |
| | SD | 9 | 0 | 20 | 52 | 85 | 18 |
| **Agri revenues** | Mean (Th MK) | 2.88 | 26.87 | 65.58 | 1.23 | 102.27 | 19.76 |
| | SD | 123.33 | 187.24 | 295.3 | 10.99 | 229.35 | 177.86 |
| **Off-farm revenues** | Mean (Th MK) | 44 | 13 | 75 | 746 | 515 | 62 |
| | SD | 330 | 57 | 325 | 5771 | 2464 | 1011 |
| **Nb of family members** | Mean | 4.61 | 4.89 | 4.93 | 4.69 | 4.39 | 4.74 |
| | SD | 2.22 | 2.17 | 2.19 | 2.03 | 2.21 | 2.2 |
| **Members working off-farm** | Mean | 1.02 | 1.09 | 0.74 | 0.96 | 0.58 | 0.99 |
| | SD | 1.05 | 1.16 | 0.95 | 0.83 | 0.75 | 1.07 |
| **Livestock (sh HH from type)** | Share of HH | 44% | 63% | 73% | 35% | 60% | 54% |
| **Value of ag. equipt** | Mean (Th MK) | 3130 | 3439 | 9774 | 3960 | 13507 | 4276 |
| | SD | 40231 | 13260 | 37359 | 20570 | 72264 | 34202 |
| **Value of durable goods owned** | Mean (Th MK) | 15.11 | 6.67 | 26.73 | 184.61 | 123.28 | 19.81 |
| | SD | 86.31 | 17.9 | 102.31 | 424.57 | 291.53 | 109.42 |
| **Access to credit** | Share of HH | 10 | 14 | 19 | 14 | 16 | 13 |
| **Receiving coupons (\*)** | Share of HH | 48.32 | 61.24 | 65.5 | 27.82 | 41.82 | 53.95 |
| **Receiving safety nets** | Share of HH | 20% | 16% | 16% | 12% | 11% | 18% |

Note: HH = households

Source: IHS3, authors'calculations

(*) coupons : subsidized inputs

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# Future steps recommended

This preliminary typology is based exclusively on the IHS3 database, and follows the WAW international methodology to the letter. There are several limitations to this preliminary work. The first one is the absence of information on agricultural estates, despite the fact that according to the available estimates they account for 1% of all agricultural holdings, provide about 30% of agricultural production (focusing especially on cash crops such as sugar, tea and coffee) on around 20% of cultivated land, and contribute to 40% of agricultural GDP. Thus this analysis is rather a portrait of family farming than a nationally representative typology. Secondly, there is a need to deepen the typology and specifically to go into more details at the regional level.

Future steps recommended are:
- In the short term, deepen the typology with more statistical analysis of the existing available data from the rich IHS3 and other previous research, such as the very high quality livelihood zoning, and poverty analysis. The typology should also be regionalized.
- At this point it is crucial that local stakeholders should be consulted, both to test the relevance of the typology and enrich it.
- Increase the robustness of the typology through field studies.

Finally, it would be useful to increase the relevance of the classification of agricultural holdings for policy purpose, by working more closely on the different public programs aimed at farmers and their targeting criteria.

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# 1. Introduction

Better characterizing the diversity of agricultural holdings and the drivers of their transformations is key to inform policy makers and design programs better fitted to the diverse needs and capacities.

There are different ways of seeing and representing the various forms of agriculture. Smallholder and family farming have acquired an international legitimacy as relevant categories but their potential to provide enough food, feed, fuel and employment are often being questioned. A better knowledge of the way the agricultural holdings are structured and transforming is necessary to evaluate the drivers of changes and the consequences of different policies. Such knowledge is important for policy discussions since it enables to understand which structures of agriculture (more specifically which combination of diverse structures) will meet the multiple expectations of society.

The United Nations has declared 2014 the "International Year of Family Farming" hence raising international attention on this specific type of agriculture holding. The World Agriculture Watch (WAW) initiative is moving the debate forward by providing an international methodology to analyze agricultural holdings. The FARM foundation, foreseeing the usefulness of such typology and its relevance to Malawi internal policy debates, has decided to contribute by testing the methodology on the last available database on Malawi, the third Integrated household survey of 2010 released in 2012.

## 1.1 The World Agriculture Watch initiative

The World Agriculture Watch (WAW) was recently set up as a consortium of several institutions (FAO, IFAD, the French government and Cirad). WAW aims to inform an inclusive policy dialogue on the diversity of agricultural systems, structural changes affecting them and their impacts.

The first step of WAW is to propose an original conceptual framework based on a systemic approach and a common methodology to define agricultural holdings. WAW has launched in February 2013 a participatory exploratory work to revise WAW Methodological Framework (WAW 2012) and test it on several case studies, taking stock of existing typologies and indicators at holding level. This case study on Malawi complements other case studies currently testing the international typology.

## 1.2 Policy debates in Malawi

Malawi is a densely populated country with an estimated 15 million people, 85% of which living in rural areas. The country is highly dependent on agriculture, which accounts for over 30% of GDP and is critical for job creation opportunities, export diversification and poverty reduction (USAID 2009). Maize is the main crop, produced and consumed by a majority of households in Malawi, while since the 1990s tobacco has been the main export crop. Historically, the agricultural system in Malawi has been characterized by a dual system with on the one hand a small number of large estate farms and on the other hand very large number of smallholders. The system, inherited from the colonial administration, was perpetuated after independence, with each type of agricultural holdings specializing in some crops, export crops for estates and staple crops for smallholders. Little is known of their diversity. Several studies

have aimed at categorizing smallholders farmers (see below), but the main entry has been either size of land cultivated or income level.

There are two major policies targeted at smallholder farmers.

Since 2005, the main component of the agricultural policy has been the Fertiliser Input Subsidy Program (FISP), which aims to increase maize productivity of smallholders (Pauw and Thurlow 2014). It provides subsidized fertilizer and seeds to around 1.5 million farm families (50% of the farming population) and costs about US$ 100 million per year. Since targeting criteria are loosely defined in favor of "the most vulnerable maize producers" (when most farmers produce maize and the majority live under the poverty line), and the targeting system is community-based (local authorities and community leaders identify program beneficiaries), the program faces fundamental difficulties in reaching the household it is intended to and avoiding leakages benefitting to non-poor households. Several annual evaluations put forward suggestions to improve the targeting criteria and procedures. However, these attempts have not succeeded so far (Dorward and Chirwa 2012). Furthermore, the decision to target the poorest households impacts the economic effectiveness of the program, since their use of fertilizers is less optimal and leads to a smaller increase in production (Ricker-Gilbert and Jayne, 2011). Other countries, such as Tanzania decided to rather specifically target their input subsidies to households who will use fertilizers in the most economically efficient way (Holden and Lunduka 2012).

Moreover other social policies in Malawi aimed at poor households are currently being scaled up in the country, such as a social cash transfer and a public work programs.

It can be argued that the best way to ensure the food security of the population in the longer term would be for the country to rely on a combination of complementary policies, and implement for instance the "twin track strategy" suggested by the High Level Panel of Experts (HLPE 2012) which would actually combine the social supports for the most vulnerable citizens with productive support for poor workers (Douillet 2013). The first step in that direction requires recognizing the diversity of poor maize farmers. This is where a typology of agricultural holdings would be of use.

With the presidential election in May 2014, the subject is bound to be high on the political agenda in Malawi in the coming years.

## 1.3 Objectives of this report

The overall objectives of the household typology is to characterize the transformation of agricultural holdings in relationship to their characteristics (endowment in various assets - natural, financial, social, physical and human-) and better identify specific areas where farmers, policymakers or stakeholders need to focus their attention for investments or supports thanks to the understanding of the households' strategies.

The aim of this report is to provide a preliminary typology of agricultural holdings in Malawi that could usefully contribute to raising the interest of researchers and policymakers for preliminary analytical understanding and political lobbying on the diversity of farm households. The specific objectives of this report are to contribute to the WAW reflections on the international methodology but also to Malawi internal policy debates.

To do so we provide a small manageable number of households types, which are described based a variety of criteria and whose proportion is the population is estimated at the national level.

## 1.4 Methodology

Many classifications of farm households have been developed for Malawi over time, but none of them start with the labor, management status and market orientation entry points of WAW. Nevertheless they bring very important insights.

### 1.4.1 Previous analysis of the diversity of farm households in Malawi

We find several attempts at studying the diversity of farm households in Malawi in the literature. It is either the holding size or the income level that serve as the basis of classifications of households in most of them.

The land size entry is widely used, for instance by Chulu and Wobst (2001). Peters (2007) explains indeed that "*Unsurprisingly in a densely populated region, adequate land is one of the most critical differentiating factors among rural families, and there are significant correlations between size of landholding and maize harvests, income, and assets.*" The author is talking about her study region located in the South of Malawi where population density is much higher than in the North (respectively 144 hab/km2 and 46 hab/km2). But to our mind her point is valid for Malawi as it is a very densely populated country on average.

Gender has also been used as a proxy for income poverty level. Indeed women headed household are found to be poorer than men-headed ones (Malawi Government /UNICEF-1993, Brown *et al.*- 1996). But according to Peters (2007), a less known fact is that the better-off households are jointly headed households where the role of a wife/adult woman is crucial, as she finds in her study region.

The geographical region is also often been used to determine the agricultural opportunities potentially available (Simler 1994; Dorward 2002). Indeed the country is very diverse in terms of agro ecological zones: the North of the country is at a higher altitude, more hilly and humid, with forest areas, and the South is made of dryer lowlands (apart from the Mount Mulanje where most tea production is located) prone to climatic shocks. The Central region, a mid altitude plateau, is often considered to have the highest agricultural potential. The most comprehensive analysis of agro-ecological and socioeconomic characteristics to date has been the definition of livelihood zones developed by the Malawi Vulnerability Assessment Committee (MVAC, 2005) to establish the baselines and monitoring system to generate a deeper understanding of rural livelihoods, food access issues, and the ability of households from different wealth groups to cope with shocks and vulnerability. It defines 17 livelihood zones in Malawi.

According to Dorward (2002), attempts to classify rural households in specific areas of Malawi with cluster analysis based mainly on those criteria[2] of land size, gender and region were found to regroup very heterogeneous types of households (Kydd and Christiansen 1982; Dorward 1999; Orr and Jere 1999).

The best example of this continuity is given by the work of Pauline Peters (2006). The anthropologist conducted a panel analysis of rural households between 1986 and 1997 in the

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[2] Cluster analysis is used to identify combinations and values of variables describing different groups and make similar groups of households.

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Zomba district (South of Malawi). In an article published in 2006 she describes the evolutions of the various households she has followed over time and their causes. She does not create categories of households per se, but describes them by income quintile. Over the 1986–97 period she finds a pattern of rapidly accelerating differentiation among rural families: in 198-87 the top income quartile of the Zomba sample households had a total income three times that of the bottom income quartile, whereas this difference increased to nine times in 1990–91 and to 11 times in 1997. Despite the increasing income inequality, she argues that "*the income differentiation is produced largely out of very similar activities. [...] Families at the top and the bottom ends of the income and wealth distributions draw on the same resources and carry out the same productive activities, but in different proportions and with different outcomes.*" Her deep knowledge of the region and the constraints and opportunities of farmers are precious to point us in the right direction when looking for key variables. She pinpoints, in particular, access to land, gender of household head (and jointly headed household), production of tobacco (although the differencing impact of the crop seem to have reduced since 1990s), cultivation of *dimba* (very good wetland or stream-bank gardens on which high value crops can be cultivated throughout the year), access to credit, remittances and other off-farm income sources.

For the last 10 years, Professor Andrew Dorward (SOAS) has been involved in the development of a household typology of Malawi for modeling purposes. The latest version was built with a cluster analysis of the 2003/4 Integrated Household Survey (IHS2) based on the geographical classification of the livelihood zones, adopting the same procedures as described by Dorward (2002) with the 1998 Integrated Household Survey (IHS1). His typology has meant to group households into classes that have similar behavioral characteristics and similar welfare characteristics, but has been limited by the quality and reliability of the data. Nevertheless it gives us an interesting basis for our analysis, as it outlines that variation in regular off-farm employment, remittances, value of productive asset holdings, estimated retained maize per household member, holding size per household member, access to credit, and gender of household head.

Building on these analyses, we will look at the variables cited above as our main descriptive variables, after using the WAW entry variables of labor, management status and market orientation, and deeply rely on the authors' description and understanding of households' strategies in Malawi to analyze our data.

## 1.4.1 The WAW methodology

The three specific indicators selected by the WAW Methodological Framework (WAW 2012) to capture the characteristics of agricultural holdings and establish effective comparisons are:

- The **type of labor used:** the use of hired labor is distinguished from the use of family labor;
- The **management status** of the holdings: information on management status is used to distinguish capitalistic holdings for which the capital comes from external investors who do not work on the farm ;
- And the **market orientation** of the holdings: the level of market integration to distinguish self-sufficient and commercial farms.

We started by looking at the available data for each of the three indicators in the latest household survey of Malawi. At this stage, we only analyzed the data at the national level.

Future test would need to regionalize this analysis, taking advantage of the MVAC 2005 livelihood zoning exercise, and being complemented by field surveys.

We had to define thresholds for most variables, which we discuss in the paper. However, we are aware that the choice of those thresholds is arbitrary, as is the decision to regroup the households from the 12 first types identified, in a smaller and manageable number of types to serve as basis for discussion. As Dorward (2002) puts it "*there are no a priori reasons for expecting households to be arranged in distinct clusters or groupings with particular sets of similar characteristics. The processes of change and differentiation in rural economies suggest instead that most variables will show continuous variation (although some 'thresholds' will exist and cause discrete variation) but that behavioural and other interactions between variables will lead to some consistent patterns of variation suitable for classification*".

## 1.5 Data: The Third Integrated household survey (2010), LSMS-ISA

We use the most recent household survey in Malawi, the Third Integrated Household Survey, released in 2012. This survey was undertaken as part of the Living Standards Measurement Study-Integrated Surveys on Agriculture (LSMS-ISA) project of the World Bank, established to explore ways of improving the type and quality of household data collected by statistical offices in developing countries. It has a specific module on agriculture. Details on the sampling methods, the sample and organization of the survey are described in National Statistical Office, 2012. Data and survey questionnaires were downloaded from the World Bank site.

The data was collected from 2009 to 2011 and covers 12,272 national representative households and 10,158 households involve in agricultural activities. The modules cover education, health, farm implements, shocks, food consumption and, the agriculture module concerns land, crops, harvests, sales, inputs and coupons as well as livestock and fisheries. The household data offers the opportunity to have a look into socio and financial assets. One agriculture module is also devoted to the receipt of coupons from the FISP.

## 1.6 A nationally representative typology?

It is difficult to have data on the large-scale agricultural estates in Malawi. But estimations are that in the 1990's, the estates contributed to about 30% of agricultural production and produced especially cash crops (tea, coffee) (Chilowa 1998). Ricker-Gilbert, Jumbe and Chamberlin (2014) state that about 30,000 agricultural estate farms exist and they cover around 1.2 million ha, while 1.8–2 million smallholder farms cover about 4.5 million ha. According to Chirwa and Matita (2012), estate contribute to around 40% of agricultural GDP.

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**Figure 2: Key data on the relative weight of smallholders and estates**
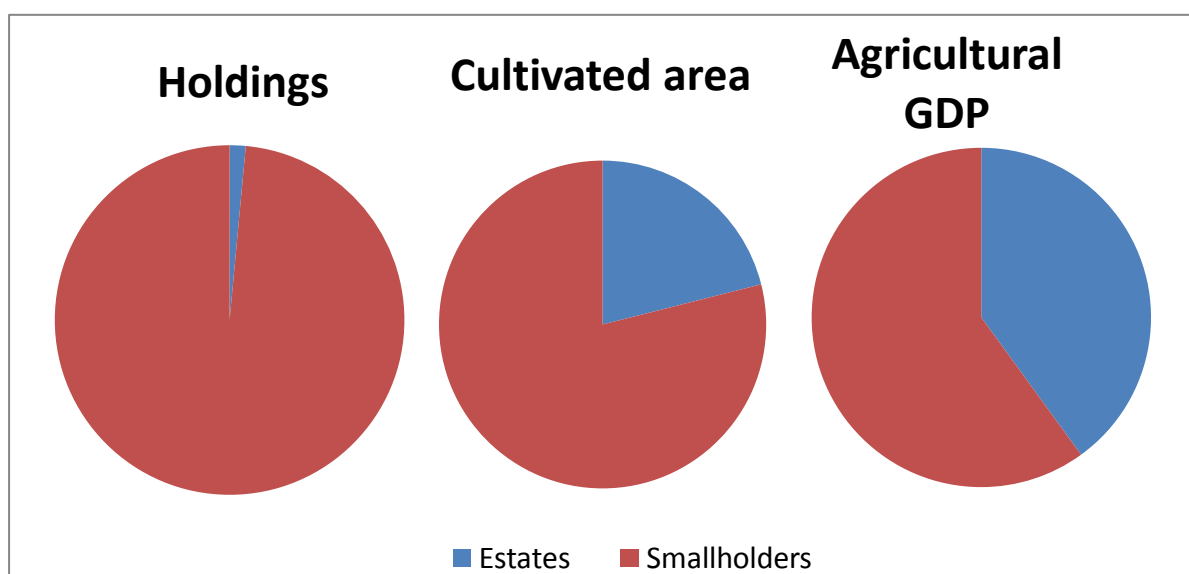


Source: Authors' compilation from data of (Chilowa 1998). Ricker-Gilbert, Jumbe and Chamberlin (2014) and Chirwa and Matita (2012).

There are several reasons why we think estates are (quasi) absent from the IHS3:

- No estate owners were interviewed in the enterprise module. The only information on estate in IHS3 is when household members declare being employed by one in the household module.
- Looking at the size and crop information of the agricultural module, estates are clearly missing. It makes sense, if they are corporate agriculture and not family business, since the survey is dedicated to households and is not an agricultural census.

**Figure 3: Size of cropland by holding**
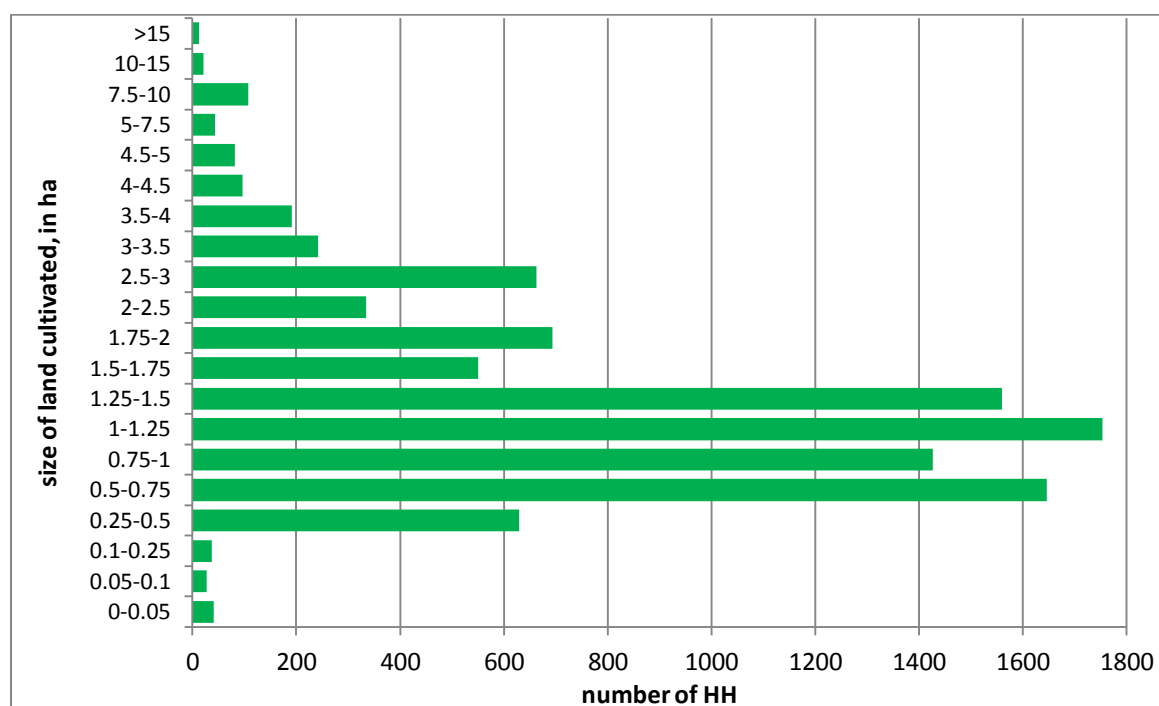


Source: IHS3, authors' calculations

Indeed looking at the size of the cropland cultivated declared by the household interviewed (Figure 3), we see that the maximum land size declared in the sampled is 42 ha and that most households cultivate less than 2 ha. Interestingly, the 42 hectares are cultivated by a household which has not declared any hired labor, only family labor.

Furthermore, there are very few observations of traditional exports crops such as tea and coffee, and no data on sugar (mostly produced by estate plantation in Malawi).

The lack of information about estates (in the data and in the literature) means that our preliminary typology will not try to describe them.

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# 2. Nation-wide results of the WAW indicators

In this section, we first take the three indicators of the WAW Methodological Framework (WAW 2012) in turn to build the first groups. We come up with 12 groups of holdings.

## 2.1 The Labor criteria

The WAW Methodological Framework (2012) highlights the relevance of using "family vs. hired labor" as the main differentiating variable for the identification of types of agricultural holdings around the world. The idea behind this specification is that the category using *mostly* family labor generally includes the "peasants" without or with a restraint access to input and output markets. The inverse situation is when households only use hired labor. This is the corporate farms category. The intermediary category, that of patronal farms, use both family and hired labor.

In the international typology, there are two ways of differentiating the family farms from patronal farms:

- the first one is by differentiating temporary hired labor from permanent hired labor;
- the second one is by defining a threshold of the share of hired labor on the share of total labor.

Another pending question is whether it should be an international threshold or whether a local definition of the threshold is necessary: the FAO definition of family farming is that more than 50% of labor used is family labor, whereas other cases studies have defined local threshold for the maximum use of permanent hired labor (0 in France, up to 2 in Latin America).

In the IHS3, there are very detailed data on agricultural labor: for each plot, by season, days of labor are registered for each agricultural activity, by gender (men, women, children) and type of laborer (i) household members, (ii) hired labor and (iii) free/exchange labor.

### 2.1.1 The free/exchange labor

Before creating the categories based on the labor criteria, we are faced with the question of how to consider the free/exchange labor with respect to family and hired labor. As presented in the table below, in the IHS3, the free/exchange labor weights 2% of the sample and 13% of households declare using it (Table 3).

**Table 3: Number of holdings by kind of labor used in days**

Total of labor on plots by kind of labor, in days

| Variable | Obs | Mean | Std. | Min | Max | Sh of total labor |
|----------|-----|------|------|-----|-----|-------------------|
| **Hh labor** | 10045 | 133 | 124 | 1 | 2500 | 93% |
| **Hired labor** | 2798 | 17 | 32 | 1 | 660 | 5% |
| **Free labor** | 1368 | 12 | 21 | 1 | 380 | 2% |
| **Total labor** | 10158 | 138 | 127 | 1 | 2500 | 100% |

Source: IHS3, authors' calculations

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We have two possibilities: on the one hand the hired labor can be considered as family labor (as it is free and based on informal exchange of labor between families); on the other hand it can be considered as external hired labor as the free labor is fed during the days worked, as it can be for the hired labor or *ganyu*[3] that can be paid in kind. It is noteworthy that 5 households of the sample declare only using free labor. Depending on our final choice, those households will be either considered as a family farms or as a corporate farms (i.e. no household member working on the farm).

The former was chosen based on the literature (mostly Bezner Kerr[4] 2005 on Malawi and Saravia-Matus and Gomez-Y-Paloma 2014 on Sierra Leone) and the data. Indeed, from the network roster of the households using free/exchange labor, 14% of the free laborers are declared as being relatives and 13% friends. 16% also come from pastoral organization.

We statistically tested that choice. We computed two tests on the basis of the average days worked with the two options (free labor included with family labor compared with free labor included with hired labor). First a test of the mean differences of the revenues from agricultural activities and then chi2 tests on the share of households engage in agricultural activities (both cultural seasons, tree crop productions and livestock products). The tests showed that both choice could make sense: the average number of days worked by family farms, patronal farms and corporate farms are significantly different from one another whether free labor was included with family labor or rather with hired labor (meaning the differences can statistically be attributed to differences between farm types rather than random fluctuations). We also did the same tests adding the marketing orientation sub categories (described below), and found the same results. Hence, the two classifications could make sense.

We thus decided to stick with the choice of including the free/exchange labor in family labor rather than hired labor.

## 2.1.2 The four labor categories

In our dataset, we have both cultural seasons, with most farmers cultivating only the rainy season and only 12% of households growing crops during the dry season. But we decided to sum labor used for both seasons[5].

In most other case studies using the WAW methodology, a key question is to find the adequate threshold to distinguish family farms using *mostly* family labor (and some hired labor, considered as temporary) from other types of farms using permanent salaries (as in the case studies such as Nicaragua and France). In the case of Malawi, there is no indication in

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[3] *Ganyu* is a specific type of informal daily work, very common in Malawi and mostly done in agriculture. In IHS3, *ganuy* is not registered as a source of hired labor for the farming activities of the household but rather as an off-farm source of income for family members.

[4] According to Bezner Kerr (2005) "Collective work parties, in which a group of people work on one household's farm for a given agricultural task **in exchange for a meal**, is also not considered *ganyu*. Individuals working in their kin's field are said to be ''helping out relatives,'' also not considered *ganyu*".

[5] It would make sense to revise that judgement and do the analysis with only the labor data of the rainy season. Additional analysis could also be devoted to the respective use of hired labor in the dry and rainy season.

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the dataset whether the hired labor is temporary or permanent and our attempt was inconclusive[6]. We rather used the FAO definition of family farming using more than 50% of family labor.

**Figure 4: Distribution of holdings per share of hired labor**
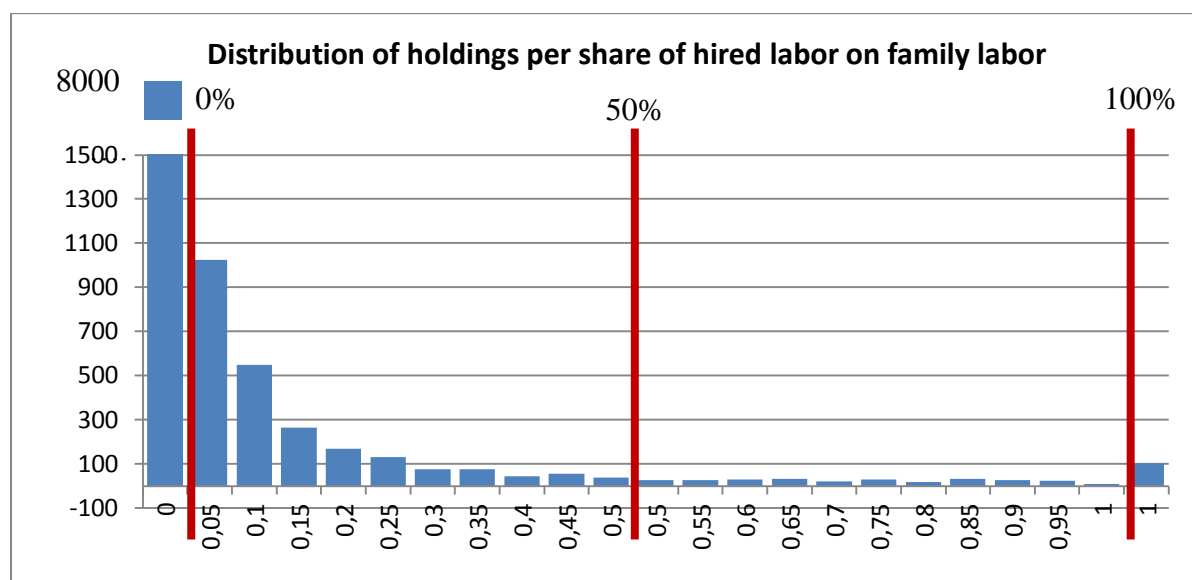


Source: IHS3, authors' calculations

As is apparent in the Figure 4 above, the households only using family labor and free labor already represent 7,360 households, that is to say 72% of the sample (Table 4). We decided to also keep that sub category and, to add a second one with the family farms hiring some labor (FF2) representing 24% of the sample.

The households with more than 50% hired labor are considered patronal farms (PF1). They represent 3% of the sample.

In the last category, we have the household declaring only using hired labor and never working on their fields themselves. They represent 1% of the households. Those households could belong to the corporate farms category (WAW 2012). But looking at their characteristics more precisely, we find that they cultivate less than 3 ha of crop on average and that the maximum cropland cultivated is 11 ha. Together with the fact that in a household survey we would not necessarily expect to find the corporate farms, which are very large businesses not held by physical persons (WAW 2012). In the end, it seems more logical that those 1% holdings be categorized as patronal farms with absentee owners (PF2) rather than corporate farms.

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[6] Based on the data of the number of days worked, we tried to define a threshold of days over which laborers should be considered permanent salaries but a very small part of the sample entered that definition.

**Table 4: Distribution of holdings based on the labor criteria**

| Labor criteria | Number of holdings | Share of holdings (%) |
|----------------|--------------------|-----------------------|
| FF1 | 7,360 | 72.46 |
| FF2 | 2,422 | 23.84 |
| PF1 | 275 | 2.71 |
| PF2 | 101 | 0.99 |
| Total | 10,158 | 100 |

Source: IHS3, authors' calculations

Descriptive statistics based on the labor criteria show how powerful it is as a distinguishing factor among holdings (Appendix 1). First, family farms tend to devote more labor (in total amount of days) to agriculture than the patronal farms. Agricultural revenues increase sharply with the amount of hired labor, and PF2's agricultural revenue is on average five times higher than FF1's. Also, across labor category, we find decreasing average labor intensity (defined as the ratio of the number of days worked on the land size cultivated). This decreasing trend could be attributed to the transaction costs of hired labor (i.e. enforcement of contracts if any, monitoring of the labor, etc.) and fits well with the theory as described by Eastwood, Lipton and Newell (2010). The labor criterion is also powerful to discriminate between the diversified and specialized holdings, with the family farms being more diversified and the patronal farms more specialized (Appendix 2 and 8). Lastly, it is also strong differentiating factor as regards to off-farm work: the share of holdings involves in off-farm work as well as the number of days worked off-farm and the revenues from off-farm work sharply increase with the use of hired labor. The off-farm work variable appears then to be a strong variable to differentiate the holdings.

## 2.2 The management criteria

According the WAW methodological framework, the management criteria must reflect the decision making on the holding. It allows distinguishing holdings with external capital holders not working on the farm and a hired manager (who can be a family member) from holdings where the family members take the decisions.

In the IHS3, there is no question that adequately reflects those concerns since in the enterprise module, no estate was interviewed. Although we do not necessarily expect to find adequate data in a household survey on corporate farms, we still looked at the available data.

In the agricultural module, there is a question on who takes the decision on each plot, but only one household member can be registered. We tried to use other information, such as the status on land (if the household holds or rents its lands) and to cross check it with the household member who takes the decisions on land (either the head household or any other member) (Tables 5 and 6).

Considering that Malawi is one of the most densely populated African countries (more than 150 people per square kilometer in 2010 according to the World Bank), land is scarce. Moreover land rights are mostly customary and uncertainties on tenure are considered a serious issue. Hence even if this variable is not answering directly the WAW methodology it is able to capture, to a certain extent, the vulnerability of households within the renting category that may be suffering from land scarcity and it in or have too few labor to take advantage of their land and rent it out. The quality of the land rented might be lower. In that sense, the body of decision makings is restrained by the status on land.

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We thus compute a "renting category" including both household who rent in and rent out land.

**Table 5: Status of land by farm category**

|  |  | FF1 | FF2 | PF1 | PF2 | Total |
|---|---|---|---|---|---|---|
| All plots owned | Nb of HH | 6,860 | 2,018 | 204 | 73 | 9,155 |
|  | Share of category | 93 | 83 | 74 | 72 | 90 |
| Rented (in or out) at least one plot | Nb of HH | 500 | 404 | 71 | 28 | 1,003 |
|  | Share of category | 7 | 17 | 26 | 28 | 10 |
| Pearson chi2(2) = 319.29   Pr = 0.000 | | | | | | |

Source: IHS3, authors' calculations

This land status variable of the LSMS database doesn't enable us to better distinguish categories of "decision making" as it can be done with census data (corporate farms is defined by the presence of a hired manager and no family labor). The decision variable is not adequate since there is no difference in the share of households renting with the member making the decisions as the chi2 test confirms it ($p$=0.5). We tried to see if the status on land was correlated with the decision making but results were not significant.

**Table 6: Land status and decisions pattern (only HH for which data available)**

|  |  | Only household head | Other members | Total |
|---|---|---|---|---|
| Person who takes decision on plot (all plots) | | | | |
|  | Nb of HH | 8,685 | 1,247 | 9,932 |
|  | Share of all HH | 87.44 | 12.56 | 100 |
| Land status | | | | |
| **Renting at least one plot** | Nb of HH | 868 | 115 | 983 |
|  | Share of all HH | 9.99 | 9.22 | 9.9 |
| **Owning all plots** | Nb of HH | 7,817 | 1,132 | 8,949 |
|  | Share of all HH | 90.01 | 90.78 | 90.1 |

Pearson chi2(2) = 1.2527   Pr = 0.535
Source: IHS3, authors' calculations

As a consequence, in this preliminary typology we only take into account the labor and market criteria.

## 2.3 The market orientation

According to the WAW methodology, the market orientation criterion is designed to capture market insertion and degree of self-consumption. It helps take into consideration the degree of monetization and surplus of holdings, its contribution to home-consumption and market economy. It can be key to target and evaluate policy with increasing attention to "commercialization" and food security, often under-estimating non market economy (WAW, 2012).

This criterion helps distinguish among households the spectrum of agricultural forms described in the literature: "the agricultural household"(De Janvry, Fafchamps and Sadoulet

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1991; Bardhan and Udry 1999), the "subsistence", the "marketing", the "patio gardens", etc. (WAW, 2012).

Another criterion of market orientation concerns the orientation of the production on cash crops versus staple crops. In a second step, both criteria are cross checked.

## 2.3.1 Choices in the variable used for the market orientation

Based on the data from the IHS3 we have the choice to distinguish holdings integrated in the markets and those who are not with the quantity of production sold or by using revenues from sales.

We chose the former -that is the quantity of production sold-, for several reasons: first, there are more missing data for revenues than for quantities, and secondly agricultural revenues are linked to other exogenous driver factors such as the bargaining power and the social capital of the household. Thus, we considered that the use of the marketed production variable[7] was more adequate to classify households as subsistence or market oriented.

Based on the data (Figure 5 below) what is striking is that within each labor category, a large majority of the households sampled report not selling any of their agricultural production (from 71% for PF to 44%). Furthermore, some households declared a market share (in volume) greater than 100% (sales in volume higher than harvest). We believe it may indicate that those households have stored their crops or may better remember earnings from sell than harvest. Whatever the reason, we decided to keep the outliers.

## 2.3.2 Results on the thresholds of the share of production sold

The choice of thresholds is indeed arbitrary. After wondering whether to keep and test the relevance of a 10% threshold, we decided to settle for two: Since, the household who are not selling at all (0% threshold) already represent 55% of the total sample, we decided to keep them as a separate group. Then, we took the international threshold from the FAO World Census of agriculture fixed at 50%.

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[7] Unfortunately, according to some experts, it seems that this variable is considered unreliable in the IHS3. This assumption should be checked and other options should thus be considered as this work is pursued.

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**Figure 5: Distribution of holdings per share of production sold, in volume**
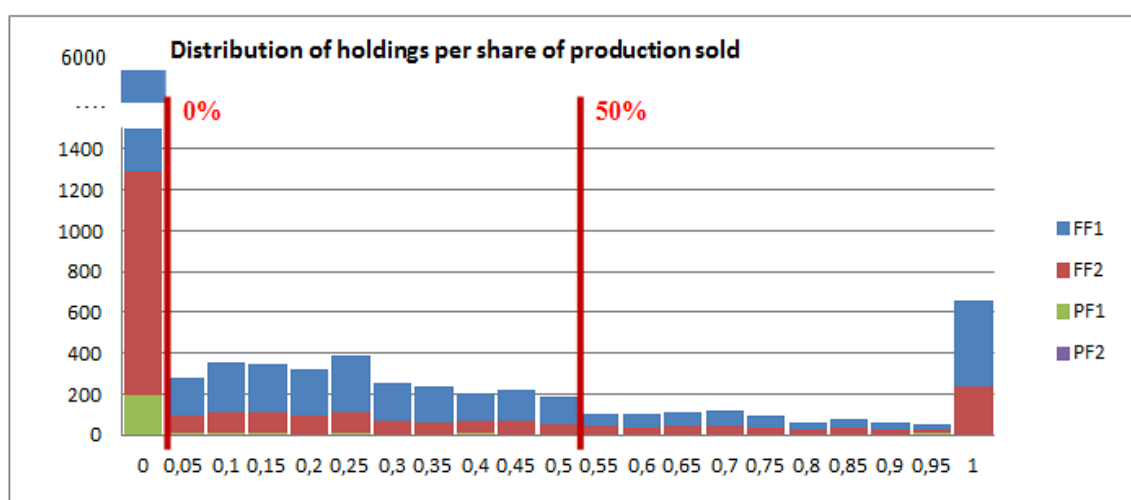


Source: IHS3, authors' calculations

At this stage, we thus divide each labor type in three groups: (i) the subsistence households who don't sell any agricultural products, (ii) the semi-subsistence households who sell less than 50% of their production and (iii) the commercial ones who sell 50% or more of their production (Table 7).

**Table 7: Distribution of the holdings by the market share criteria**

| | | |
|---|---|---|
| Subsistence (0%) | 5,608 | 55% |
| Semi-subsistence ( 0 - 50%) | 2,877 | 28% |
| Commercial (>50%) | 1,673 | 17% |
| | 10,158 | |

Source: IHS3, authors' calculations

As surprising as the high number of subsistence households within each labor category might look, it does make some sense in the context of Malawi. Indeed in Malawi, most household produce maize (97% of the farm households in IHS3). According to Peters (2006) "*Common to families at all levels of income is the desire to produce as much of their staple maize as possible. The apparently tautological reason I was given over and over by farmers, that 'chimanga ndi moyo' (maize is life), states not merely that maize is 'the staff of life' but also implicitly refers to the pervasive uncertainty in supplies and prices of maize.*"

But other uses than sales are made of the crops (and registered in the IHS3). We learn for instance that 21% of the households use part of their production as "gifts, reimbursements for land, labour or inputs". If we used that threshold for the subsistence group, it would fall to 46% of total household rather than 55% when considering the share of production sold.

As the figures below demonstrate, it is not because households do not sell their crops on the markets or use them as reimbursement that they are autarkic, in the sense that they are not linked to markets. Many have to sell at least part of their crop right away because they are cash constrained or indebted. Most households are not self sufficient in food anyway and rely on off-farm work, paid in cash or in maize, to feed their families during the "hunger" season (November-February).

According to et al. (2010), based on 2006-2009 data, around 60% of smallholders were net buyers of maize, of which around 5% made distress sales of grain right after harvest (around April/May) to cover debts incurred over the farming season, pay school fees, etc, only to buy back later in the season at higher prices. The authors estimated that less than 30% of the smallholders neither bought nor sold maize, and around 12% were net sellers of maize (self-sufficient).

But according to Peters (2006) contrary to what is often considered for smallholders in general, in Malawi food self sufficiency and commercialization "*are not two alternative orientations, but interdependent strategies followed by individuals and households, best understood in relative terms.*" Indeed she finds that the better-off households with larger landholdings, larger maize harvests, and higher cash incomes did not reduce the proportion of own produced maize in their total maize/food needs, although they did have a lower share of retained crops in total agricultural output and in total income (including non-farm income). Hence although they traded more, their food self sufficiency was higher. For the author, *"this relationship also shows that the poor, indeed the poorest, are in no way 'outside the market' as some writers have erroneously assumed about Malawi"*.

## 2.4 The 12 categories to test

The following Table 8 shows the results from the 12 groups of households based on the combination of the labor and market criteria chosen.

It should be noted that all the commercial patronal farms are very small sample of less than 30 observations.

Our aim has been to test the choice of the various labor and commercialization thresholds, and see whether those categories could be merged. As labor and market are not sufficient variables to understand the behaviors of the households and compare the holdings, we rely on other variables, especially the ones pointed out by the literature, such as land size by household member and off-farm work. The analysis of those variables are extensively presented in the Appendices and summarized in the Tables 10 and 11 below.

Considering the importance given to level of income and off-farm work in the literature, we started by looking at them. In the LSMS data there are several detailed questions on three types of off-farm works: *ganyu* (short term casual labor contracts, especially in the agricultural sector), other salary work, and income from enterprise(s) owned by the household. In the literature we find that *ganyu* is related with poverty (Whiteside 2000). Indeed, Bezner Kerr (2005) sees *ganyu* as coping strategies to shocks, and to her mind, household vulnerability is illustrated by *ganyu* supply. Other type of off-farm work are seen as indicators of ways to escape poverty (Orr, Mwale and Saiti-Chitsonga 2009; Dimowa, Michaelowa and Weber 2010)**.**

**Table 8: Distribution of holdings across the 12 groups**

| Group number | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Names | FF1 - Pure family farms | | | FF2 - Family farms with hired labor | | | PF1 - Patronal farms | | | PF2 - Absentee patronal farms | | | |
| | S | SS | C | S | SS | C | S | SS | C | S | SS | C | |
| Labor criteria (share of labor) | No hired labor | | | < 50% hired labor | | | > 50% hired labor | | | Only hired labor | | | |
| Market criteria (share of volume of production sold) | 0 | <50% | ≥50% | 0 | <50% | ≥50% | 0 | <50% | ≥50% | 0 | <50% | ≥50% | |
| Number of obs | 4,431 | 1,89 | 1,039 | 1,054 | 778 | 590 | 195 | 52 | 28 | 71 | 14 | 16 | 10,158 |
| % of total | 44% | 19% | 10% | 10% | 8% | 6% | 2% | 1% | 0% | 1% | 0% | 0% | 100% |
| % of labor groups | 60% | 26% | 14% | 44% | 32% | 24% | 71% | 19% | 10% | 70% | 14% | 16% | 100% |

Source: IHS3, authors' calculations
Note: S=subsistence; SS=semi-subsistence; C=commercial.

We find that the labor criteria is very powerful to order the households by revenues from off-farm work. We also see a very net decrease in *ganyu* labour, even between the two family farm groups, with more than 50% of the family farms not hiring any labor engaging in *ganyu* while this share drop at less than 35% for the ones hired some labor, less than 10% for patronal farms and less than 5 for absentee patronal farms. Also of importance, the average daily wage for off-farm work is almost 10 times higher for patronal farms with no family labor than pure family farms, with a gradual increase along the four labor categories. This can be related to the increasing level of education along those groups.

Regarding the farm activities, we find that maize is an important culture for Malawian (Smale, Byerlee and Jayne 2013) : almost every household is engaged in maize production (97%), which is targeted by a specific policy aiming at boosting its production. Across labor categories, we find a slight increasing trend in total land endowments, productive assets, and crop specialization but the differences are less straightforward than for wealth indicators. Nevertheless, we find increasing maize harvest (despite no significant differences in maize area and family labor), hence increasing maize productivity (both land and labor productivity). Lastly, it is important to note that the PF2 are the less equipped (in axe, *panga* knife, sickle and treadle pump).

What is striking is to see that the labor criteria is also very powerful to order the households by increasing wealth, whether in terms of revenue from agriculture, revenues from off-farm work, and other incomes, possession of durable goods, and livestock, and decreasing food insecurity (declared). This is very coherent with the description both of Peters (2006) and Dorward (2002) of the fact that the households with the larger incomes had better means to purchase agricultural inputs, food and higher value consumption goods, and had higher maize production and productivity.

On the reverse, the poorer households are described as being extremely cash constrained and trapped in a vicious circle of low paid ganyu. "*Time allocation data indicated that temporary jobs taken up by members of poor, land-short households had extremely low returns to effort directed away from own farm production. In years of poor harvests, the number of jobs and the rates of compensation dropped even more, so forcing some of the poorest into desperate circumstances. These poor households are caught in a vicious cycle: they are unable to generate enough income and food from their own production, yet their off-farm work does not*

*generate a large enough income to increase substantially their low maize and other food stores"* (Whiteside 2000).

Such vicious cycles also help to perpetuate inequality. The better-off households who, on average, have more land, bigger maize harvests, more agricultural and nonagricultural income, disproportionately hired neighbours as well as temporary labourers coming from other areas. A primary use of the large surplus maize stores held by these better-off households was to hire workers in the peak agricultural season. The vicious cycle for the poor is tightly bound to the virtuous cycle of accumulation by the better-off."

On the other hand the commercialization threshold, within each category is also powerful to classify households according to their crop orientation (decreasing share of household only producing staple crops, and increasing share of household engaged in tobacco, and cotton production), but also decreasing crop specialization (with very net differences between the subsistence and the other groups within each labor category). We also find within each labor category the share of urban farms is much higher in the subsistence subgroups, and that the size of land by household member is much lower.

Our feeling is that, adding as entry point other discriminating variables than labor and commercialization threshold would be necessary in order to properly classify those holdings. But at this stage, we relied on those groups.

In the case of both family farms groups, we find that there is a net difference between the subsistence sub-groups and the two ones selling some of their crops, which share very similar characteristics in terms of the allocation between on and off-farm activities (subsistence spending more time in days on off-farm), share of leguminous, available land by household member, share of holdings engaged in *ganyu* or age (the subsistence being the oldest). At the same time, it is interesting to notice that within their respective groups, the subsistence FF1 and FF2 own durables goods of higher value than the ones oriented toward markets. Hence to decrease the number of types it would make sense to merge those subgroups.

The first three groups of our preliminary typology are composed of:

> A. Subsistence family farms;
> B. Commercial family farms without any hired labor;
> C. Commercial family farms with some hired labor.

It is interesting to note that, for those groups we ended up merging all the sellers, hence the market orientation threshold we keep is the 0% one rather than the 50% one. This is an important finding considering the debates on this threshold for the international typology. Indeed, in the case of Malawi the semi-subsistence households (selling between 0 and 50%) share more similarities with the commercial ones than the with the subsistence ones, especially in terms of agricultural production and economic assets (off-farm income, possession of durable goods).

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**Table 9.1: Descriptive statistics on economic variables across the 12 groups (1/2)**

| Group number | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Labor criteria | | FF1 (no hired labor) | | | FF2 (< 50% hired labor) | | | PF1 (≥50% hired labor) | | | PF2 (no family labor) | | | |
| Market criteria | | 0 | <50% | ≥50% | 0 | <50% | ≥50% | 0 | <50% | ≥50% | 0 | <50% | ≥50% | |
| Number of observation | | 4 431 | 1 890 | 1 039 | 1 054 | 778 | 590 | 195 | 52 | 28 | 71 | 14 | 16 | 10 158 |
| % of total | | 44% | 19% | 10% | 10% | 8% | 6% | 2% | 0.5% | 0.3% | 0.7% | 0.1% | 0.2% | 100% |
| % of labor groups | | 60% | 26% | 14% | 44% | 32% | 24% | 71% | 19% | 10% | 70% | 14% | 16% | 100% |
| Size of land cultivated | mean | 0.97 | 1.33 | 1.26 | 1.16 | 1.59 | 1.84 | 1.08 | 1.13 | 1.95 | 0.66 | 2.89 | 1.62 | 1.19 |
| | median | 0.8 | 1.02 | 1.02 | 0.82 | 1.23 | 1.42 | 0.81 | 0.84 | 1.47 | 0.52 | 1.63 | 1.12 | |
| | Max | 42 | 21 | 8.92 | 23.73 | 9.74 | 13.3 | 11.8 | 4.86 | 7.96 | 2.88 | 11.5 | 5.52 | 42 |
| size/HH member | mean | 0.27 | 0.35 | 0.3 | 0.3 | 0.4 | 0.43 | 0.28 | 0.45 | 0.48 | 0.16 | 0.91 | 0.32 | 0.31 |
| age | mean | 44.2 | 42.2 | 41.0 | 43.1 | 42.8 | 41.5 | 41.8 | 44.3 | 36.2 | 40.5 | 42.8 | 37.1 | 43.0 |
| Share male headed HH | | 71% | 76% | 83% | 76% | 80% | 86% | 79% | 67% | 89% | 76% | 93% | 100% | 75% |
| hhsize | | 4.54 | 4.82 | 4.99 | 4.96 | 4.89 | 4.97 | 4.71 | 4.02 | 4.64 | 4.63 | 4.29 | 5.25 | 4.74 |
| sh active | | 54% | 52% | 54% | 53% | 52% | 54% | 56% | 48% | 59% | 62% | 63% | 58% | 53% |
| education | | 68% | 78% | 79% | 86% | 88% | 89% | 90% | 87% | 93% | 94% | 86% | 100% | 76% |
| Rural | Share HH | 93% | 98% | 98% | 78% | 94% | 96% | 44% | 71% | 89% | 30% | 71% | 50% | 0.91 |
| Agri revenues (livetsock inc.), th of MK | mean | 1 | 15.7 | 48.3 | 10.8 | 34.9 | 108 | 1.7 | 13.6 | 163.6 | 0 | 99.1 | 285.8 | 19.8 |
| | SD | 5.5 | 29.1 | 316.4 | 282.5 | 97.8 | 437.8 | 12.8 | 22.7 | 263 | 0.4 | 219.4 | 379.6 | 177.9 |
| Livestock | Share HH | 43% | 63% | 62% | 55% | 70% | 75% | 38% | 56% | 68% | 28% | 64% | 56% | 54% |
| Livestock index | mean | 75 | 90 | 68 | 123 | 164 | 153 | 312 | 74 | 177 | 47 | 126 | 599 | 102 |
| Productive assets | | | | | | | | | | | | | | |
| watering can | Share HH | 14% | 30% | 41% | 21% | 38% | 48% | 11% | 23% | 50% | 15% | 43% | 38% | 25% |
| ox cart/ox plough | Share HH | 4% | 9% | 22% | 8% | 17% | 31% | 6% | 6% | 11% | 1% | 14% | 6% | 10% |
| Access to credit | Share HH | 9% | 13% | 16% | 16% | 19% | 18% | 11% | 15% | 11% | 20% | 21% | 25% | 13% |
| Off-farm revenues, all HH | mean | 18.6 | 12.3 | 14.5 | 144.2 | 66.6 | 88.4 | 713.7 | 124.5 | 304.3 | 836.3 | 390.3 | 2260.1 | 62.2 |
| | sd | 126.9 | 54.2 | 63.6 | 688.1 | 282 | 381.9 | 6454 | 291.8 | 785 | 3259.7 | 1019.3 | 6160 | 1011.1 |
| Engaged in off-farm work (incl. Ganyu) | Share HH | 71% | 71% | 69% | 75% | 66% | 63% | 86% | 77% | 86% | 87% | 86% | 94% | 71% |
| Off-farm daily wage | mean | 0.6 | 0.5 | 0.6 | 1.8 | 1.2 | 1.4 | 6.4 | 1.1 | 2.4 | 7.9 | 3.3 | 8.9 | |
| - if so, days off-farm/on farm | mean | 1.21 | 0.38 | 0.3 | 2.49 | 0.86 | 0.72 | 6.67 | 5.5 | 2.21 | 8.02 | 3.03 | 8.29 | 1.29 |
| | sd | 11.95 | 1.5 | 1.3 | 9.26 | 2.07 | 1.75 | 14.45 | 7.25 | 2.88 | 22.73 | 4.18 | 13.22 | 9.18 |
| Engaged in Ganyu | Share HH | 53% | 57% | 55% | 29% | 33% | 32% | 7% | 2% | 7% | 4% | 7% | 0% | 47% |
| - if so income from ganyu | mean | 304.7 | 313.6 | 338.3 | 293.2 | 269 | 285.8 | 733.3 | 400 | 0 | 533.3 | 0 | 0 | 308.6 |
| | sd | 563 | 499.2 | 725.1 | 542.4 | 363.1 | 537.6 | 1341.7 | 0 | 0 | 416.3 | 0 | 0 | 564.2 |
| Durable goods | share HH | 78% | 85% | 87% | 91% | 95% | 94% | 97% | 98% | 100% | 94% | 100% | 100% | 84% |
| | mean | 8.7 | 6.7 | 6.7 | 41.2 | 24.1 | 30.7 | 145.2 | 47.4 | 111.9 | 292.9 | 166 | 352.3 | 19.8 |
| - Estimated Value | SD | 56.1 | 21.3 | 10 | 154.2 | 75.8 | 131.4 | 320 | 71 | 181.2 | 618.4 | 406 | 566.3 | 109.4 |

**Table 9.2: Descriptive statistics on economic variables across the 12 groups (2/2)**

| | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Cultivate maize (RS) | Share HH | 95% | 98% | 96% | 98% | 99% | 98% | 96% | 100% | 93% | 94% | 100% | 81% | 97% |
| Use hybrid seeds | Share HH | 42 | 44 | 39 | 52 | 52 | 47 | 62 | 50 | 85 | 69 | 36 | 77 | 45 |
| Sell some maize | Share HH | 0 | 27 | 32 | 0 | 33 | 38 | 0 | 52 | 64 | 0 | 36 | 44 | 14 |
| Revenues from maize | Mean | | 4939 | 9258 | | 8608 | 23495 | | 8581 | 54667 | | 21600 | 263743 | 11592 |
| Land productivity | Mean | 0.63 | 0.50 | 0.53 | 0.67 | 0.52 | 0.50 | 0.72 | 0.62 | 0.64 | 0.84 | 0.52 | 0.54 | 0.59 |
| Labor productivity | Mean | 827 | 1434 | 440 | 1104 | 1659 | 607 | 1802 | 1880 | 1422 | 1880 | 2694 | 2082 | 1030 |
| Qqty fertilizer used | Kg | 122 | 116 | 132 | 164 | 129 | 173 | 200 | 187 | 240 | 265 | 289 | 289 | 135 |
| Access to extension services | | 42 | 52 | 54 | 46 | 53 | 61 | 46 | 58 | 71 | 46 | 50 | 56 | 48 |
| Crop diversification | Mean | 0.67 | 0.5 | 0.53 | 0.68 | 0.5 | 0.5 | 0.72 | 0.61 | 0.68 | 0.85 | 0.55 | 0.75 | 0.6 |
| (herfindhal index) | SD | 0.27 | 0.18 | 0.19 | 0.27 | 0.18 | 0.18 | 0.28 | 0.25 | 0.27 | 0.24 | 0.22 | 0.26 | 0.25 |
| Staple crops | | | | | | | | | | | | | | |
| cassava maize | Share HH | 96% | 99% | 97% | 99% | 99% | 99% | 96% | 100% | 96% | 94% | 100% | 81% | 97% |
| leguminous | Share HH | 46% | 67% | 59% | 50% | 71% | 72% | 37% | 54% | 43% | 21% | 64% | 25% | 55% |
| other (fruits, veg, groundnut, rice) | Share HH | 42% | 52% | 38% | 38% | 51% | 36% | 38% | 54% | 36% | 18% | 57% | 19% | 43% |
| Export crops | | | | | | | | | | | | | | |
| tobacco | Share HH | 0% | 23% | 40% | 1% | 22% | 47% | 0% | 6% | 29% | 0% | 7% | 44% | 14% |
| cotton | Share HH | 1% | 5% | 8% | 0% | 3% | 6% | 1% | 2% | 0% | 0% | 14% | 6% | 3% |
| Self-declared food insecure (year) | Share HH | 60% | 56% | 53% | 36% | 36% | 31% | 9% | 27% | 7% | 17% | 14% | 6% | 51% |
| Main reasons | | | | | | | | | | | | | | |
| 1/drought | | 45 | 32 | 28 | 35 | 23 | 27 | 17 | 29 | 0 | 17 | 0 | 0 | 38 |
| 2/ small land size | | 12 | 11 | 9 | 12 | 7 | 5 | 11 | 0 | 50 | 8 | 50 | 0 | 11 |
| 3/ lack of farm inputs | | 32 | 45 | 51 | 35 | 51 | 54 | 28 | 43 | 0 | 17 | 50 | 0 | 39 |
| 4/food too expensive | | 5 | 5 | 4 | 10 | 9 | 5 | 33 | 29 | 0 | 33 | 0 | 0 | 6 |

Source: IHS3, authors' calculations

Merging patronal subgroups reveals much more difficult. On the one hand each subgroup seem very distinct, on the other hand, the small amount of observations is an argument that they should be merged somehow. Sub groups are heterogeneous and each one has distinct socio-economic characteristics. For example, 70% of the holdings of the subsistence absentee patronal farms are urban and 29% for the semi-subsistence ones. The subgroup of commercial absentee patronal farmers (12) is the only group not engaging in *ganyu* and has distinct characteristics, which would justify keeping it on its own. Nevertheless it is composed of a very small sample. It seems to be sharing many similarities with the subsistence subgroups. On the other hand, it is not obvious that the so called "absentee patronal" farms are relying on an external hired manager (in the corporate model). Indeed 70% of this subgroup is subsistence. More generally, the subsistence groups are less equipped, have less livestock and smallest land to cultivate than the commercial groups. However, they have higher land productivity. Hence for the paternal farms it also seems that the 0% threshold is more relevant than the 50% threshold.

For those reasons, the two groups created are:

    D. The "absentee" patronal farms made of the two subsistence patronal subgroups (groups 7 and 10);
    E. The commercial patronal farms (groups 8, 9, 11 and 12).

# 3. Towards a preliminary typology

In this section, we present the final 5 types after we merged some of the 12 groups for the purpose of simplifying the typology for policy discussion (Table 10). A 6th group could be estates, for which we do not have any data.

The subsistence family farms (A) represent 53% of the holdings and the subsistence patronal farms (D) 3%. The commercial groups (B, C and E) amount to less than 45% (Table 10).

**Table 10: Distribution of the 5 types of holdings in the population**

|  | A. Subsistence family farms | B. Commercial pure family farms | C. Commercial family farms with hired labor | D. Subsistence absentee patronal farms | E. Commercial patronal farms |
|---|---|---|---|---|---|
| Group number | 1, 4 | 2, 3 | 5, 6 | 7, 10 | 8, 9, 11, 12 |
| Number of holdings | 5,342 | 3,034 | 1,406 | 266 | 110 |
| Share of total HH | 53% | 30% | 14% | 3% | 1% |

Source: IHS3, authors' calculations

Figure 6 shows that the subsistence family farms (A) harvest 44% of the land area cultivated, however they only contribute for 26% to the production harvested. The commercial family farms with hired labor (C) produce 36% of the total crops harvested but provide only 21% of farm labor and cultivate 20% of agricultural area.

**Figure 6: Distribution of farm types by on-farm variables**
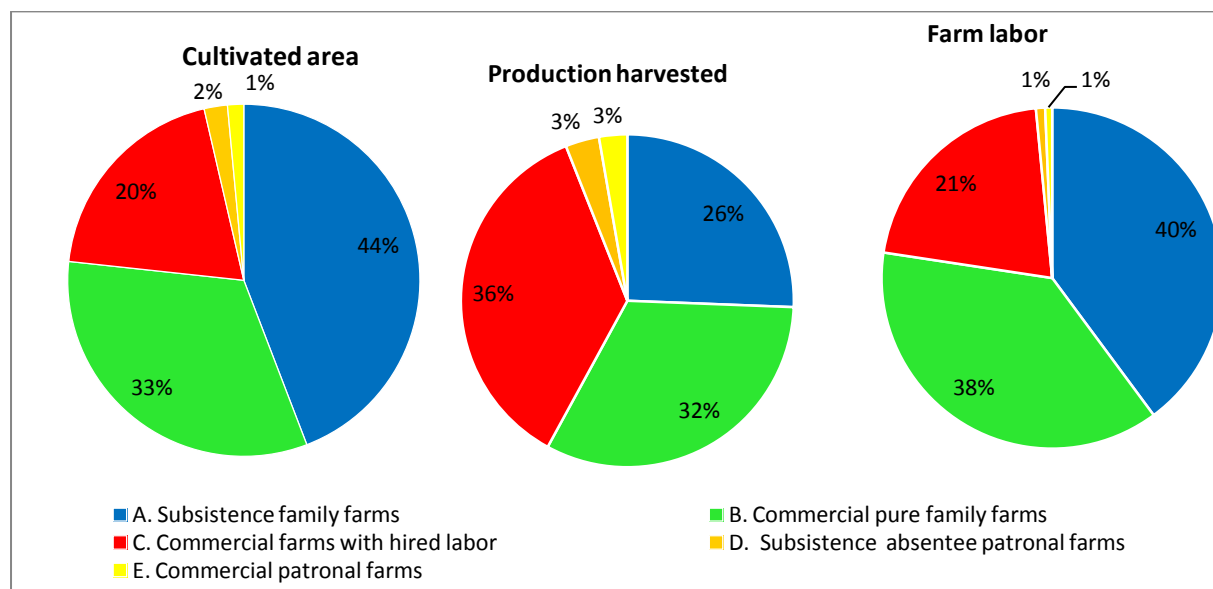


Source: IHS3, authors' calculations

Looking at off-farm variables gives a more complete picture of the contribution of the different type of holdings to economic activities (Figure 7). For instance, comparing the distribution of types in number of holdings and their contribution to off-farm labor, it appears that all types of farms holdings are actively involved in off-farm activities, but commercial pure family farms (B) much less than the other types. Additionally comparing the share of holdings by type, the contribution to off-farm labor and the distribution of off-farm revenues

(Figure 7), subsistence patronal farms (D) are found to devote more time to off-farm activities than other farm types and these off-farm activities are found to be overall much more remunerative than for the other farm types. This is linked to the fact that the average daily wage is much higher for formal activities but also more *ganuy* (Table 11), which could seem surprising but coherent with the tendency described by Peters (2006).

**Figure 7: Distribution of farm types by off-farm variables**
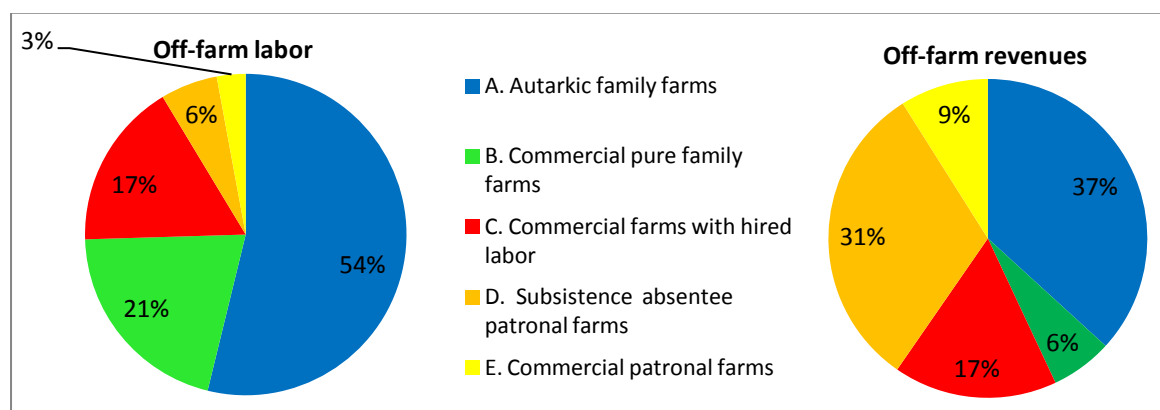


Source: IHS3, authors' calculations

Tables 13 and 14 present the main statistics on the economic variables and the orientation of the production for the different types. The section follows with the description of each group of the typology. This section ends with statistics and figures on socio economic variables and on the distribution of land size of each crop (Figures 9 and 10).

**Table 11: Descriptive statistics on the economic variables across the typology**

| | | A. Subsistence family farms | B. Commercial pure family farms | C. Commercial farms with hired labor | D. Subsistence absentee patronal farms | E. Commercial patronal farms | Total |
|---|---|---|---|---|---|---|---|
| On farm work, share of hired labor over total labor (days) | Mean | 3% | 0% | 9% | 79% | 77% | 6% |
| | SD | 8% | 0% | 10% | 18% | 20% | 16% |
| On farm work, any labor (days) | Mean | 105 | 172 | 212 | 44 | 82 | 138 |
| | SD | 92 | 132 | 176 | 69 | 102 | 127 |
| On farm work, family labor (days) | Mean | 103 | 172 | 197 | 10 | 18 | 133 |
| | SD | 90 | 132 | 171 | 20 | 31 | 125 |
| Agricultural revenues, in th MKW | Mean | 2.88 | 26.87 | 65.58 | 1.23 | 102.27 | 19.76 |
| | SD | 123.33 | 187.24 | 295.30 | 10.99 | 229.35 | 177.86 |
| Off-farm | Sh of HH | 72% | 70% | 64% | 86% | 83% | 71% |
| Share of family labor allocated to on farm work (on total family labor) | Mean | 80% | 88% | 84% | 49% | 42% | 82% |
| | SD | 30% | 22% | 27% | 48% | 46% | 29% |
| Off-farm work, family labor (days) | Mean | 40 | 25 | 58 | 111 | 139 | 41 |
| | SD | 116 | 89 | 144 | 195 | 193 | 118 |
| Off-farm revenues, in th of MK | Mean | 44 | 13 | 75 | 746 | 515 | 62 |
| | SD | 330 | 57 | 325 | 5771 | 2464 | 1011 |
| Off-farm revenues if off-farm work, in th of MK | Mean | 61 | 19 | 116 | 867 | 622 | 88 |
| | SD | 389 | 67 | 399 | 6213 | 2699 | 1201 |
| Ganyu | Yes | 49% | 56% | 33% | 6% | 4% | 47% |
| Ganyu revenues if *ganyu* | Mean | 486 | 508 | 466 | 804 | 375 | 493 |
| | SD | 703 | 686 | 504 | 1187 | 171 | 682 |
| Daily *ganyu* wage if *ganyu*, in MK | Mean | 34 | 44 | 43 | 10 | 200 | 38 |
| | SD | 116 | 93 | 72 | 14 | 0 | 105 |
| Possession of durable goods | Yes | 80% | 86% | 95% | 97% | 99% | 84% |
| Durable, sum in th of MK | Mean | 15.11 | 6.67 | 26.73 | 184.61 | 123.28 | 19.81 |
| | SD | 86.31 | 17.90 | 102.31 | 424.57 | 291.53 | 109.42 |
| Remittances, in th of MK | Mean | 5388 | 2460 | 7872 | 42491 | 33541 | 6134 |
| | SD | 76686 | 20384 | 42708 | 137076 | 152247 | 65232 |
| Farm implements, estimation, th of MKW | Mean | 3130 | 3439 | 9774 | 3960 | 13507 | 4276 |
| | SD | 40231 | 13260 | 37359 | 20570 | 72264 | 34202 |
| Rural | Share of HH | 90% | 98% | 95% | 40% | 73% | 91% |

Source: IHS3, authors' calculations

We computed a livestock index based on Dorward (2002) to have an aggregated index representing the ownership of different types of livestock (Table 12).

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**Table 12: Descriptive statistics on agricultural orientation across the typology**

| | | A. Subsistence family farms | B. Commercial pure family farms | C. Commercial farms with hired labor | D. Subsistence absentee patronal farms | E. Commercial patronal farms | Total |
|---|---|---|---|---|---|---|---|
| % one crop | Share of HH | 32% | 7% | 6% | 50% | 25% | 22% |
| % 2 crops | Share of HH | 35% | 36% | 31% | 30% | 40% | 35% |
| Only staple crops | Share of HH | 98% | 66% | 63% | 100% | 79% | 83% |
| Only export | Share of HH | 1% | 0% | 0% | 3% | 3% | 1% |
| Both staple and export | Share of HH | 2% | 34% | 37% | 0% | 18% | 16% |
| Cassava maize | Share of HH | 97% | 98% | 99% | 96% | 96% | 97% |
| Leguminous | Share of HH | 41% | 47% | 45% | 33% | 45% | 43% |
| Others | Share of HH | 47% | 64% | 71% | 33% | 48% | 55% |
| herfindhal's index | Mean | 0.67 | 0.51 | 0.5 | 0.76 | 0.64 | 0.6 |
| | SD | 0.27 | 0.19 | 0.18 | 0.27 | 0.26 | 0.25 |
| Possession of livestock | Share HH | 44% | 63% | 73% | 35% | 60% | 54% |
| | n° of HH | 2,358 | 1,910 | 1,020 | 94 | 66 | 5,448 |
| Bovine | Mean | 0.21 | 0.31 | 0.75 | 0.73 | 0.74 | 0.33 |
| | SD | 1.93 | 1.83 | 5.92 | 9.11 | 4.4 | 3.2 |
| Ovine | Mean | 0.74 | 1.15 | 2.03 | 0.82 | 1.35 | 1.05 |
| | SD | 2.36 | 2.95 | 3.79 | 2.6 | 2.72 | 2.82 |
| Pig | Mean | 0.18 | 0.44 | 0.73 | 0.29 | 0.65 | 0.34 |
| | SD | 1.08 | 1.64 | 2.25 | 1.78 | 2.91 | 1.53 |
| Poultry | Mean | 2.83 | 4.19 | 6.32 | 3.31 | 7.86 | 3.79 |
| | SD | 6.42 | 6.67 | 9.31 | 7.43 | 33.67 | 7.89 |
| Livestock index | | 36 | 55 | 115 | 90 | 109 | 55 |

Source: IHS3, authors' calculations

## A. The subsistence family farms

The subsistence family farms, that make up the majority (53%) of agricultural holdings, rely mostly on family labor but also hires a small amount of daily workers (3% of total days worked). They have not declared any sales of their crop production on the markets. But they still have agricultural revenue from sales of livestock. They are also linked to food and labor markets through consumption of food and their labor force is engaged in off-farm work on other farms for cash or food and poorly paid non-farm activities. More than 50% of the households from our sample belong to this type, and hence it is diverse[8]. This type includes among the poorest households of the sample, but on average has a higher agricultural revenue than the patronal subsistence farms (D) (livestock) and higher off-farm revenue than commercial pure family farms (B). Another indicator of the diversity of the group is that it has the highest share of household not owning any durable goods (20%) but on average they own more durable goods than the commercial pure family farms (B). Subsistence family farms also receive on average higher remittances than the commercial pure family farms (B). They are more engaged in off-farm work than B and highly engaged in *ganyu* (informal agricultural

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[8] Further work should specifically look into the diversity of this category.

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daily work). The head of those farms are somewhat older than average household head, more likely to be women (29% of women headed households), and their education level is lower.

They own the less farm implements than other types of households and cultivate on average among the lowest land size, but with a wide diversity, since the household cultivating the largest land size of the sample (40 ha) belongs to this category. They also have the lowest access to credit (10%). They tend to have the most specialized cropping pattern (maize, cassava and pulses mainly), focusing on food staple production.

**Table 13: Share of holdings producing crops**

|  | A. Subsistence family farms | B. Commercial pure family farms | C. Commercial farms with hired labor | D. Subsistence absentee patronal farms | E. Commercial patronal farms | Total |
|---|---|---|---|---|---|---|
| **Maize** | 96% | 97% | 99% | 95% | 95% | 97% |
| **Tobacco** | 1% | 29% | 33% | 0% | 17% | 14% |
| **Gdnut** | 16% | 32% | 44% | 16% | 33% | 25% |
| **Rice** | 4% | 9% | 11% | 2% | 3% | 6% |
| **Leguminous** | 41% | 47% | 45% | 33% | 45% | 43% |
| **Cotton** | 1% | 6% | 4% | 0% | 4% | 3% |
| **Veg** | 15% | 15% | 14% | 11% | 4% | 15% |
| **Other** | 3% | 3% | 2% | 2% | 2% | 3% |
| **Cassava** | 14% | 13% | 14% | 7% | 5% | 13% |
| **Fruits** | 25% | 27% | 30% | 12% | 16% | 25% |

Source: IHS3, authors' calculations

# B. The commercial pure family farms

The commercial pure family farms represent 30% of agricultural holdings. They are solely relying on family labor for on farm work, and sell at least part of their crop production on the markets. They allocate the highest share of labor (days) to on farm work (88% compared with 82% on average), and the lowest amount of labor (in days) to off-farm work. However, this type has the highest share of labor engaged in *ganyu*. This group is not wealthier than the subsistence family farms (A) on average: They own on average less durables goods. They tend to receive the lowest amount of remittances of all types. And they own farm implements of similar value than the subsistence family farms (A).

This group is more diversified in terms of cultures than the subsistence family farms (A), and cultivate notably cotton (this type has the highest share of households involved in cotton production which used to be an important cash crop before tobacco spread in the 90s), but also rice and tobacco. Lastly, 98% of the households are rural, as compared to an average 90% for the sample.

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**Figure 8: Cropping pattern by type**
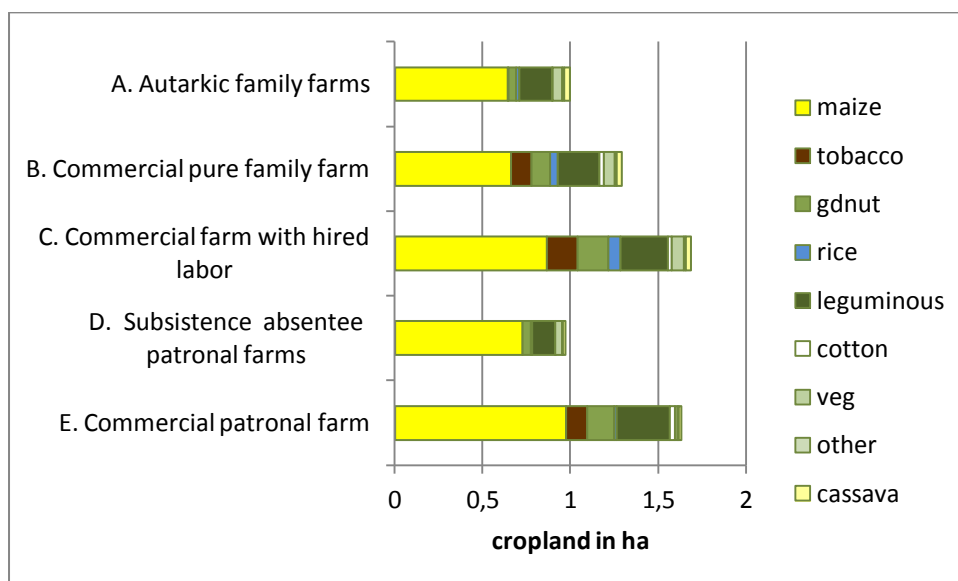


## C. The commercial family farms with hired labor

The commercial family farms with hired labor are family farms (hiring less than 50% of their on farm labor) that sell at least part of their crops on markets. They comprise 14% of agricultural holdings. This group is the one devoting on average the highest labor to farm activities (212 days compared to 138 on average), with 9% of on farm labor being hired, compared with 77% for the commercial patronal farms (E) and 6% for the overall sample.

The commercial family farms with hired labor share the same crop characteristics with the commercial pure family farms (B) in terms of diversification of cropping patterns. But they cultivate more land area. They also own the most livestock (highest livestock index). Their agricultural revenues are twice those of commercial pure family farms (B).

Their share of households working off-farm is the lowest (64%) of the sample and only 33% of them are supplying *ganyu* whereas for the subsistence family farms (A) and commercial pure family farms (B) the share is nearly half. Based on their possession of durables goods and farm implements, they seem to be the wealthiest family farms. They also have the highest access to credit.

According to the data, the commercial family farms with hired labor have the highest share of households receiving coupons with the highest average number of coupons per households of all farms household.

| | | A. Subsistence family farms | B. Commercial pure family farms | C. Commercial farms with hired labor | D. Subsistence absentee patronal farms | E. Commercial patronal farms | Total |
|---|---|---|---|---|---|---|---|
| Cultivated land area, in ha | Mean | 1.00 | 1.30 | 1.69 | 0.97 | 1.63 | 1.19 |
| | SD | 1.18 | 1.13 | 1.33 | 1.23 | 1.72 | 1.22 |
| Cultivated area by household member | Mean | 0.28 | 0.33 | 0.42 | 0.25 | 0.50 | 0.31 |
| | SD | 0.40 | 0.46 | 0.43 | 0.34 | 0.65 | 0.43 |
| Household size | Mean | 4.61 | 4.89 | 4.93 | 4.69 | 4.39 | 4.74 |
| | SD | 2.22 | 2.17 | 2.19 | 2.03 | 2.21 | 2.20 |
| Age HH head | Mean | 44.09 | 41.74 | 42.26 | 41.47 | 40.98 | 43.03 |
| | SD | 17.16 | 15.45 | 15.20 | 14.90 | 15.27 | 16.36 |
| Sex HH head | Male | 71% | 79% | 83% | 79% | 81% | 75% |
| Chichewa literacy | Share HH | 58% | 65% | 79% | 89% | 86% | 64% |
| Receive FISP Coupons | Share HH | 48% | 61% | 66% | 28% | 42% | 54% |
| Coupon, n° get | Mean | 2.12 | 2.16 | 2.31 | 2.22 | 2.24 | 2.17 |
| | SD | 0.93 | 0.98 | 1.05 | 0.85 | 0.90 | 0.97 |
| Receive safety net | Share HH | 20% | 16% | 16% | 12% | 11% | 18% |
| Receive free maize | Share HH | 3% | 2% | 2% | 2% | 0% | 2% |
| Free maize in kg for recipients | Mean | 94 | 95 | 81 | 156 | | 94 |
| | SD | 107 | 83 | 90 | 229 | | 102 |
| Access credit | Share HH | 10% | 14% | 19% | 14% | 16% | 13% |

Source: IHS3, authors' calculations

## D. The subsistence "absentee" patronal farms

The subsistence "absentee" patronal farms type, which includes 3% of agricultural holdings, is made up of the farms holdings using more than 50% hired labor for farm activities (patronal) not selling their crops on markets. It includes the households declaring not using any family labor on farm (absentee patronal farms).

This group encompasses the best-off-farm households of the sample. They devote much less time to agriculture than the rest of the sample, spending 44 days working on farm versus on average 138 days for the whole sample. They hire the most salary (79% of total farm labor). The total land area cultivated and land available by household member are lower than for the subsistence family farms (A).

In terms of crop grown, 50% of subsistence "absentee" patronal farms grow only one crop (whereas the average is 22%). They are mainly specialized in maize, groundnut and leguminous. But the share of households growing cassava is the lowest of the sample. Few of them (35%) own livestock.

This group is very different from the subsistence family farms (A) in terms of off-farm work (86% of the households engaged compared with 72% for A and 71% on average) and in terms of off-farm revenues (they earn the highest off-farm revenues from the sample). This proves that the labor criterion is determinant in classifying the holdings. This group also receives

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more remittances than the commercial patronal farms (C), and has a higher than average education level. Only 40% of this group is rural.

28% of the subsistence "absentee" patronal farms received coupons whereas the share is 48% for the subsistence family farms (A). They receive the highest quantity of free maize per household of the whole sample.

## E. The commercial patronal farms

The commercial patronal farms are farms with more than 50% of hired on-farm labor, that sell some of their crops. They represent 1% of agricultural holdings.

This type of farms is the group the most endowed in land: They have the bigger land size and almost double land size per household members compared with A. However, the working days spent on land are low, with an average of 82 days.

More households than average own livestock, and they own the most. Household heads are on average the youngest, and mostly male.

Most households from this group are engaged in off-farm salary work (86%). Compared with the subsistence absentee patronal farms (D), the commercial patronal farms (E) engage on average half the amount of members in off-farm work (respectively 1 and 0.6 member per household) with no significant statistical difference in their average revenues (t=0.41).

This group really differs from the subsistence absentee patronal farms (D) in agricultural practices and orientation. It is the better equipped and the most diversified (Herfindhal's index of 0.64 vs. 0.76 for the subsistence absentee patronal farms (D)).

They have the lowest household size. None of them received free maize as a safety net, but 42% of them receive coupons from the FISP with the highest average number coupons per household.

The figures 9 and 10 below show clearly that the different farm types show different patterns both from the economic and socio economic characteristics. This highlights how much the labor and the market criterion are both necessary to disentangle groups. Also, it is worth noting that the wealthiest group in terms of off-farm income and value of durable goods, that is the subsistence absentee patronal farms (D), does not have the most efficient agriculture, and that it is rather the commercial patronal farms (E) that do. Finally, the most educated and the younger head households are found in the wealthiest groups.

**Figure 9: Economic radar representations of the farm types**

**Subsistence groups (A and D)**   **Commercial groups (B, C and E)**
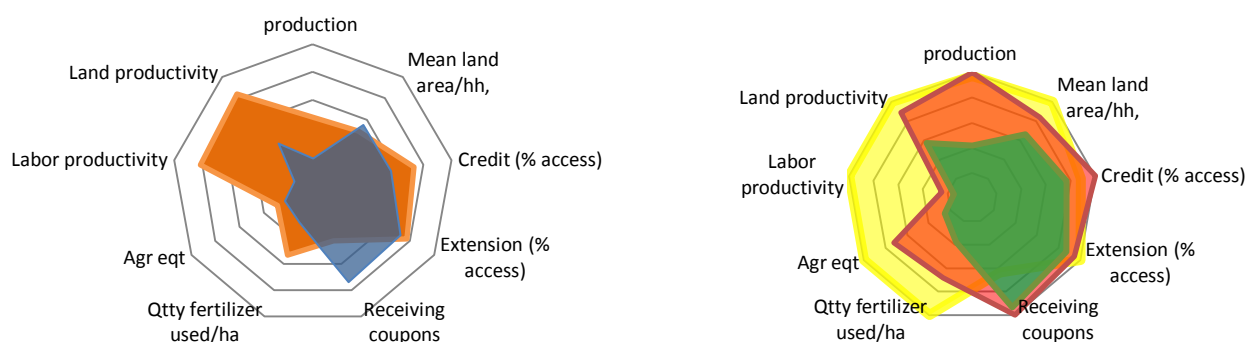


**Figure 10: Socio economic radar representation of the farm types**

**Subsistence groups (A and D)**   **Commercial groups (B, C and E)**



■ A. Subsistence family farms

■ B. Commercial pure family farms

■ C. Commercial farms with hired labor

■ D. Subsistence absentee patronal farms

■ E. Commercial patronal farms
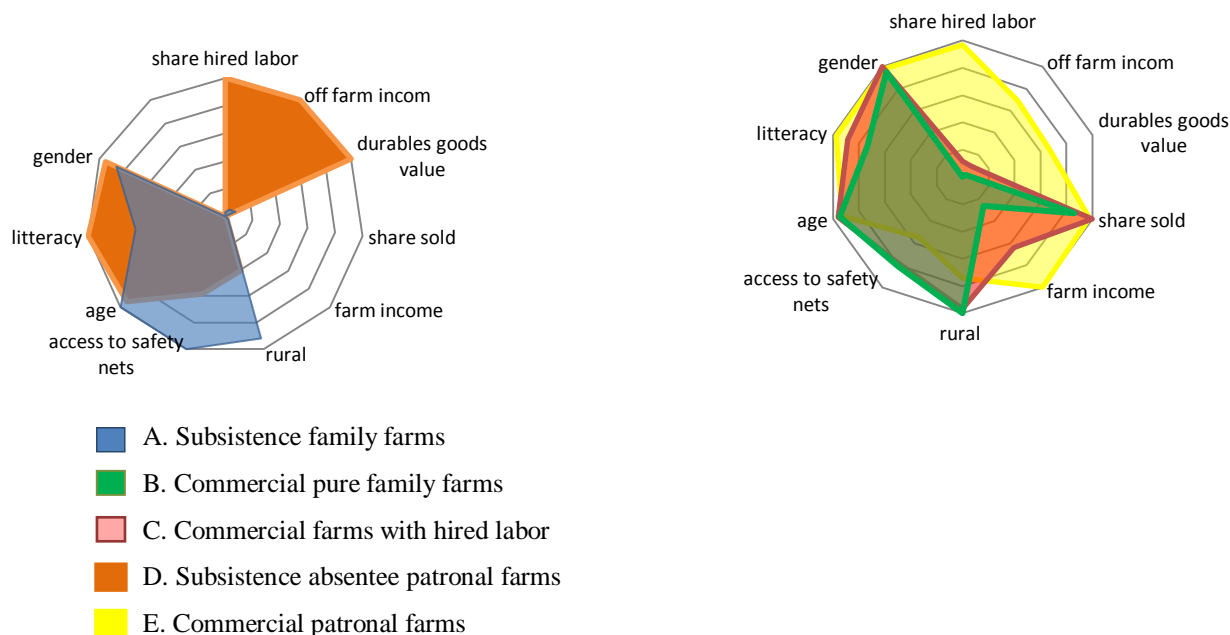
Source: IHS3, authors' calculations

# 4. Some regional results

The insight into the regional distribution of the farms (Table 15) shows first the same predominance of family farms across all regions but with differences:

- The Northern and Central areas concentrate richer households when the poorest households are found in the Southern area;
- The share of subsistence holdings (groups A and D) is more important in the southern region (66%, compared with respectively 51% for the north and 43% for the central).
- Nevertheless most patronal farms are in located the central and southern regions.

**Table 15: Distribution of types by region**

| | | A. Subsistence family farms | B. Commercial pure family farm | C. Commercial farm with hired labor | D. Subsistence absentee patronal farms | E. Commercial patronal farm | Total |
|---|---|---|---|---|---|---|---|
| North | n° of HH | 868 | 555 | 262 | 15 | 14 | 1,714 |
| | share of total HH | 8.5% | 5.5% | 2.6% | 0.1% | 0.1% | 17% |
| Central | n° of HH | 1,390 | 1,325 | 703 | 129 | 53 | 3,600 |
| | share of total HH | 13.7% | 13.0% | 6.9% | 1.3% | 0.5% | 35% |
| South | n° of HH | 3,084 | 1,154 | 441 | 122 | 43 | 4,844 |
| | share of total HH | 30.4% | 11.4% | 4.3% | 1.2% | 0.4% | 48% |
| National sample | n° of HH | 5,342 | 3,034 | 1,406 | 266 | 110 | 10,158 |
| | share of total HH | 52.6% | 29.9% | 13.8% | 2.6% | 1.1% | 100% |

Source: IHS3, authors' calculations

The Malawian statistical service used the IHS3 to define poverty lines. The southern region has the highest poverty rate, that is 63%, or in other words, 3 persons out of 5 (Republic of Malawi 2012). As agriculture is the main activity in Malawi, the figures corroborate the findings from the regional typologies as the Central region has the lowest revenues from on farm and off-farm activities and the higher share of holdings engage in *ganyu* (Table 16). The Northern and Central regions have no significant difference in the estimated possession of durables goods (t = -1.19) but households own less durable goods in the South. However, households from the southern region are found to be the most endowed in cropland. This finding highlights the need to have a more important insight into the regional analysis as well as in the quality of the land cultivated.

**Table 16: Some economic variables, by region**

| | | A. Subsistence family farms | B. Commercial pure family farm | C. Commercial farm with hired labor | D. Subsistence absentee patronal farms | E. Commercial patronal farm | Total |
|---|---|---|---|---|---|---|---|
| Number of days worked, Any labor | North | 105 | 162 | 212 | 36 | 73 | 139 |
| | Central | 114 | 197 | 237 | 49 | 91 | 166 |
| | South | 100 | 149 | 173 | 39 | 73 | 117 |
| Share of hired labor | North | 2% | 0% | 8% | 77% | 79% | 4% |
| | Central | 4% | 0% | 9% | 83% | 80% | 7% |
| | South | 2% | 0% | 10% | 75% | 73% | 5% |
| Cropland cultivated, in ha | North | 0.87 | 1.05 | 1.35 | 0.58 | 1.42 | 1 |
| | Central | 0.81 | 1.15 | 1.59 | 0.74 | 1.61 | 1.1 |
| | South | 1.12 | 1.58 | 2.05 | 1.26 | 1.73 | 1.33 |
| Agri revenues, in th of MK | North | 13 | 35 | 112 | 0 | 231 | 37 |
| | Central | 1 | 35 | 70 | 2 | 92 | 28 |
| | South | 1 | 14 | 31 | 1 | 73 | 7 |
| Share of HH engaged in off-farm activities | North | 67% | 64% | 65% | 93% | 93% | 66% |
| | Central | 69% | 68% | 64% | 88% | 83% | 69% |
| | South | 74% | 75% | 65% | 84% | 79% | 74% |
| Revenues from off-farm act, in th of MK | North | 44 | 15 | 65 | 7570 | 667 | 109 |
| | Central | 79 | 11 | 93 | 503 | 358 | 76 |
| | South | 27 | 15 | 51 | 164 | 659 | 35 |
| Share of HH engaged in *ganyu* | North | 39% | 48% | 31% | 7% | 0% | 40% |
| | Central | 46% | 56% | 32% | 5% | 2% | 45% |
| | South | 52% | 61% | 34% | 7% | 7% | 51% |
| Estimated value of durables goods | North | 22 | 9 | 25 | 355 | 224 | 23 |
| | Central | 18 | 6 | 30 | 237 | 106 | 25 |
| | South | 12 | 6 | 22 | 108 | 112 | 15 |

Source: IHS3, authors' calculations

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# 5. Conclusion

Based on the IHS3 database, and following the WAW international methodology, we found that the combination of labor and market orientation criteria is powerful to classify households by wealth level. The labor category clearly shows robustness on some criteria (where they differentiate more the holding than commercialization) but not for others, showing therefore the interest of such combination.

In the case of Malawi, in the end we found that the 50% commercialization threshold is less relevant than the 0% threshold to segregate types.

Data on off-farm activities have been instrumental for regrouping subtypes in the final typology proposed.

In the end, we provide a small manageable number of household types, which are preliminary for two reasons.

The first one is that part of the agricultural holdings of Malawi are not represented in our analysis: large-scale agricultural estates, which are part of the dual agricultural system that Malawi inherited from the colonial administration and perpetuated after independence are absent from the data we used. According to the available estimates, they account for 1% of all agricultural holdings, produce about 30% of agricultural production (producing especially cash crops such as sugar, tea and coffee), on around 20% of cultivated land, and contribute to 40% of agricultural GDP. Thus this analysis is rather a portrait of family farming than a nationally representative typology.

Secondly, there is a need to deepen the typology and specifically to go into more details at the regional level. This report is a first step that aimed at testing whether such typology could be done with Malawian data and whether it could be of interest.

Our recommendations for the next steps are:

- Deepen the typology, by adding new variables to groups homogenous households in terms of constraints and interests:

Most existing typologies' entry points are poverty, land size, and location (urban, rural, livelihood zones). The ISH3 database is rich. Considering its quality, next step could be to include more variables. Extensive research has also been devoted to measuring precisely poverty and food security. It would be most useful to take advantage of this knowledge for the purpose of this typology.

- Regionalizing the typology: Malawi is a densely populated country with very diverse agro-ecological environments. Since a very high quality livelihood zoning has already been done, we should take advantage of this knowledge and regionalize our analysis.
- Submit this preliminary typology to local stakeholders through consultations to enrich it.
- Increase the robustness of the typology through field studies.

Finally, it would be useful to increase the relevance of the classification of agricultural holdings for policy purpose, by working more closely on the different public programs aimed at farmers and their targeting criteria.

# APPENDIX 1: Descriptive variables of the 12 groups

## Appendix 1.1: Descriptive variables based on the labor criteria

The following tables summarize economic and socio assets of the different holding categories.

**Table 1.1: Descriptive statistics based on the labor criteria**

| | | FF1 | FF2 | PF1 | PF2 | Total |
|---|---|---|---|---|---|---|
| **Holdings** | Nb HH. | 7,36 | 2,422 | 275 | 101 | 10,158 |
| | % | 72.46 | 23.84 | 2.71 | 0.99 | 100 |
| **Sh of family labor** | Mean | 1 | 0.89 | 0.29 | 0 | 0.95 |
| | SD | 0 | 0.11 | 0.15 | 0 | 0.16 |
| | Median | 1 | .94 | .29 | 0 | 1 |
| **Family labor (days)** | Mean | 131 | 158 | 17 | 0 | 133 |
| | SD | 113 | 155 | 27 | 0 | 125 |
| | Median | 102 | 116 | 8 | 0 | 100 |
| **Hired labor (days)** | Mean | 0 | 13 | 42 | 43 | 5 |
| | SD | 0 | 20 | 62 | 71 | 18 |
| | Median | 0 | 7 | 26 | 21 | 0 |
| **Total labor (days)** | Mean | 131 | 171 | 60 | 43 | 138 |
| | SD | 113 | 161 | 85 | 71 | 127 |
| | Median | 102 | 127 | 34 | 21 | 82 |
| **Cropland, in ha** | Mean | 0.99 | 1.39 | 1.16 | 1.15 | 1.09 |
| | SD | 1.05 | 1.36 | 1.4 | 1.55 | 1.16 |
| | Median | .81 | 1.02 | .81 | .81 | .82 |
| **Labor intensity (total labor/cropland, days/ha)** | Mean | 263 | 173 | 73 | 59 | 235 |
| | SD | 5014 | 246 | 86 | 63 | 4270 |
| | Median | 133 | 120 | 46 | 38 | 126 |
| **Agri revenues, in MK** | Mean | 11681 | 42586 | 20411 | 59046 | 19757 |
| | SD | 120950 | 291214 | 96868 | 196946 | 177862 |
| | Median | 0 | 4200 | 0 | 0 | 545 |
| **Off-farm work** | Sh of HH type | 71% | 69% | 84% | 88% | 71% |
| **Off-farm labor (days)** | Mean | 28 | 69 | 115 | 131 | 41 |
| | SD | 94 | 154 | 187 | 215 | 118 |
| **Off-farm revenues (th of MK)** | Mean | 16.43 | 105.69 | 560.61 | 1000.05 | 62.22 |
| | SD | 105.02 | 517.82 | 5443.19 | 3686.46 | 1011.14 |
| **Household size (nb of HH members)** | Mean | 4.68 | 4.94 | 4.57 | 4.68 | 4.74 |
| | SD | 2.18 | 2.28 | 2.04 | 2.22 | 2.2 |
| **Active labor** | Mean | 2.28 | 2.45 | 2.4 | 2.76 | 2.33 |
| | SD | 1.21 | 1.37 | 1.4 | 1.71 | 1.27 |

Source: IHS3, authors' calculations

The statistics presented above are all statistically significant with regard to the mean of each category (we can state based on our samples that the number presented above are really different across farm types), except for the labor intensity (days worked by total size of the farm) (F=0.84) (for which the difference found across farm type could be reasonably attributed to random fluctuations).

Although it is not significant (meaning that the differences across categories cannot be attributed only to differences in the categories), it corroborates the view that incomplete markets for those households can explain why small farms are often cultivated more intensively than larger farms (Bardhan and Udry 1999).

## Appendix 1.2: Technical and economic orientation

To better understand the household's interests and strategies analyzing their technical and economic orientation is key.

## Crops cultivated

We first look at the type of crops cultivated. There is no statistics on the size for the tree crop category as those cultures are, most of the time, scattered across plots. The bold **0%** indicates that very few households are involved in this production.

**Table 1.2.1: Share of households producing, by crop (% of labor category)**

| Crops | FF1 | FF2 | PF1 | PF2 | Total |
|---|---|---|---|---|---|
| Maize | 96% | 98% | 96% | 93% | 97% |
| Tobacco | 12% | 19% | 4% | 8% | 14% |
| Groundnut | 6% | 9% | 7% | 4% | 6% |
| Rice | 6% | 8% | 2% | 1% | 6% |
| Leguminous | 44% | 42% | 41% | 24% | 43% |
| Cotton | 3% | 3% | 1% | 3% | 3% |
| Vegetables | 15% | 14% | 9% | 6% | 15% |
| Paprika | 0% | 0% | 0% | 0% | 0% |
| Other | 3% | 2% | 2% | 0% | 3% |
| Cassava | 14% | 13% | 8% | 3% | 13% |
| Coffee | 0% | 0% | 0% | 0% | 0% |
| Tea | 0% | 0% | 0% | 0% | 0% |
| Fruits | 26% | 27% | 15% | 9% | 25% |

Source: IHS3, authors' calculations

We find as expected that most household produce maize. There is a higher share of family farms than patronal farms producing staples such as cassava, leguminous, vegetables and fruits. The PF2 produce mostly maize, groundnut and leguminous. Overall 80% of the land cultivated is dedicated to maize and leguminous cultures.

Of all cash crop productions (namely tobacco, cotton, paprika, tea and coffee), only tobacco and cotton are cultivated by most types. But the figures for the other cash crop productions should be used with caution since very few households sampled are engaged in those productions (1%) (see below for statistics on the share of households producing each crops, sales and land size).

It appears that the PF2 not selling their production are the more specialized in maize with a share of land devoted to maize as high as 83%. The subsistence family farms devote on average 62% of their cropland to maize and 20% to leguminous (the highest share).

In the case of tobacco, there is a great variance between groups. The PF2, less engaged on average in tobacco production than the PF1, have however the highest share of land devoted to tobacco (because they have the highest land size on average).It is important to point out, that according to the data some households that do not get revenues at all from sales of crops grow tobacco. The same case appears for cotton. The cotton culture is mainly done by market oriented types of farms. The family farms have the greatest share of households engaged in this production with 3.22% compared to 2.45% of PF1.

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**Table 1.2.2: Share of producers, sellers, and share of size allocated to each crop**

| | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Size** | mean | 0.97 | 1.33 | 1.26 | 1.16 | 1.59 | 1.84 | 1.08 | 1.13 | 1.95 | 0.66 | 2.89 | 1.62 | 1.19 |
| | sd | 1.14 | 1.24 | 0.93 | 1.29 | 1.27 | 1.38 | 1.39 | 0.96 | 1.74 | 0.52 | 3.13 | 1.37 | 1.22 |
| | median | 0.8 | 1.02 | 1.02 | 0.82 | 1.23 | 1.42 | 0.81 | 0.84 | 1.47 | 0.52 | 1.63 | 1.12 | |
| | Max | 42 | 21 | 8.92 | 23.73 | 9.74 | 13.3 | 11.8 | 4.86 | 7.96 | 2.88 | 11.5 | 5.52 | |
| **Maize** | Producers (% HH group) | 95% | 98% | 96% | 98% | 99% | 98% | 96% | 100% | 93% | 94% | 100% | 81% | 97% |
| | Sellers (% HH group) | 0% | 28% | 34% | 0% | 34% | 40% | 0% | 52% | 69% | 0% | 36% | 54% | 15% |
| | % cropland (producers) | 66% | 51% | 55% | 68% | 52% | 51% | 73% | 62% | 69% | 86% | 52% | 67% | 61% |
| **Tobacco** | Producers (% HH group) | 0% | 23% | 40% | 1% | 22% | 47% | 0% | 6% | 29% | 0% | 7% | 44% | 14% |
| | Sellers (% HH group) | 0% | 97% | 100% | 0% | 93% | 99% | | 100% | 100% | 100% | 100% | | 96% |
| | % cropland (producers) | 45% | 49% | 50% | 55% | 48% | 46% | | 67% | 56% | | 11% | 26% | 48% |
| **Gdnut** | Producers (% HH group) | 14% | 33% | 30% | 22% | 44% | 44% | 18% | 37% | 25% | 8% | 50% | 19% | 25% |
| | Sellers (% HH group) | 0% | 56% | 58% | 0% | 50% | 49% | 0% | 42% | 43% | 0% | 43% | 67% | 35% |
| | % cropland (producers) | 29% | 26% | 23% | 27% | 25% | 21% | 32% | 31% | 31% | 23% | 29% | 14% | 26% |
| **Rice** | Producers (% HH group) | 3% | 11% | 6% | 5% | 12% | 10% | 2% | 4% | 4% | 1% | 0% | 0% | 6% |
| | Sellers (% HH group) | 0% | 85% | 97% | 0% | 85% | 88% | 0% | 100% | 100% | 0% | | | 61% |
| | % cropland (producers) | 36% | 36% | 42% | 39% | 35% | 39% | 37% | 26% | 43% | 14% | | | 37% |
| **Leguminous** | Producers (% HH group) | 42% | 52% | 38% | 38% | 51% | 36% | 38% | 54% | 36% | 18% | 57% | 19% | 43% |
| | Sellers (% HH group) | 0% | 67% | 74% | 0% | 67% | 66% | 0% | 61% | 80% | 0% | 75% | 100% | 33% |
| | % cropland (producers) | 6% | 6% | 5% | 6% | 5% | 5% | 7% | 2% | 2% | 9% | 5% | | 6% |
| **Cotton** | Producers (% HH group) | 1% | 5% | 8% | 0% | 3% | 6% | 1% | 2% | 0% | 0% | 14% | 6% | 3% |
| | Sellers (% HH group) | 0% | 97% | 97% | 0% | 96% | 100% | 0% | 100% | | | 100% | 100% | 76% |
| | % cropland (producers) | 36% | 30% | 39% | 19% | 33% | 27% | 50% | 37% | | | 27% | 100% | 34% |
| **Vegetables** | Producers (% HH group) | 15% | 18% | 11% | 13% | 16% | 12% | 12% | 4% | 4% | 7% | 7% | 0% | 15% |
| | Sellers (% HH group) | 0% | 31% | 29% | 0% | 27% | 30% | 0% | 0% | 0% | 0% | 100% | | 13% |
| | % cropland (producers) | 35% | 28% | 29% | 33% | 25% | 26% | 33% | 30% | 18% | 41% | 40% | | 32% |
| **Other** | Producers (% HH group) | 3% | 3% | 2% | 3% | 2% | 2% | 2% | 2% | 4% | 0% | 0% | 0% | 3% |
| | Sellers (% HH group) | 0% | 26% | 58% | 0% | 44% | 50% | 0% | 0% | 100% | | | | 16% |
| | % cropland (producers) | 29% | 24% | 27% | 25% | 25% | 27% | 26% | 25% | 22% | | | | 27% |
| **Cassava** | Producers (% HH group) | 14% | 16% | 9% | 13% | 15% | 12% | 9% | 4% | 4% | 1% | 14% | 0% | 13% |
| | Sellers (% HH group) | 12% | 22% | 32% | 15% | 26% | 36% | 5% | 50% | 0% | 0% | 0% | 0% | 1847% |
| **Tea** | Producers (% HH group) | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% |
| | Sellers (% HH group) | | | | | | | | | | | | | |
| **Coffee** | Producers (% HH group) | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% |
| | Sellers (% HH group) | | | | | | | | | | | | | |
| **Fruits** | Producers (% HH group) | 25% | 27% | 26% | 24% | 29% | 31% | 13% | 19% | 18% | 8% | 14% | 6% | 25% |
| | Sellers (% HH group) | 19% | 26% | 17% | 13% | 24% | 20% | 11% | 20% | 0% | 0% | 0% | 0% | 0% |
| **Paprika** | Producers (% HH group) | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% |
| | Sellers (% HH group) | | | | | | | | | | | | | |

Source: IHS3, authors' calculations

Rice is only grown by the PF2 (1%) with very limited share of land for this crop. Compared with national production estimates for this crop, it appears that very few rice producers where interviewed in the sample. According to the data from IHS3, cassava, that is of great interest regarding food production and climate change (cassava is less water dependent than maize), is mostly grown by family farms with 15% of households producing it for an average share of 12%.

## Maize production

Considering the importance of maize in Malawi, we analyzed the crop more in detail. Maize production represents 66% of total agricultural revenues. Hybrid varieties[9] of maize are used by 45% of households and this use is correlated with significantly higher maize harvests.

Maybe somewhat surprisingly, the share of PF2 selling maize is lower than patronal ones (with 52% and 64% of patronal holdings versus 36% and 44% respectively for corporate). But the PF2 selling more than half their production earn five times more from those sales than the patronal farms selling more than half their production that earn on average 55 thousands of MK. The share of maize revenues in total agricultural revenues is 66% on average for the population, with higher share for all except for the family farms selling more than half their production of maize for which it is around 50%.

Within the categories, the subsistence categories always have the greatest size of land devoted to maize. However, the size may not be sufficient to analyze the efficiency of producers. This is why the land and labor productivity must be a better indicator. Those indicators highlight that within groups, **the groups selling 50% or more of their production is less efficient (as shown in Table 1.2.3) than the others, except for the PF2 farms for whom the less efficient is the subsistence group.** Nonetheless, those less efficient groups are the ones who sell the most maize.

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[9] This hybrid maize category does not include recycled hybrid.

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**Table 1.2.3: Maize statistics across the 12 types**

| | | FF1 | | | FF2 | | | PF1 | | | PF2 | | | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 0 | <50% | ≥50% | 0 | <50% | ≥50% | 0 | <50% | ≥50% | 0 | <50% | ≥50% | |
| Cultivated maize during the rainy season | Nb HH | 95 | 98 | 96 | 98 | 99 | 98 | 96 | 100 | 93 | 94 | 100 | 81 | 97 |
| Use of hybrid seeds | Nb HH | 42 | 44 | 39 | 52 | 52 | 47 | 62 | 50 | 85 | 69 | 36 | 77 | 45 |
| Sellers of maize | % of HH | 0% | 27% | 32% | 0% | 33% | 38% | 0% | 52% | 64% | 0% | 36% | 44% | 14% |
| | Obs. | | 542 | 331 | | 271 | 225 | | 27 | 18 | | 5 | 7 | 1426 |
| Revenues from maize (MKW) | Mean | | 4939 | 9258 | | 8608 | 23495 | | 8581 | 54667 | | 21600 | 263743 | 11592 |
| | SD | | 8478 | 21855 | | 14232 | 55561 | | 7217 | 69928 | | 14363 | 436916 | 43631 |
| Share of maize revenues on agri revenues | % | | 73% | 56% | | 71% | 51% | | 90% | 78% | | 82% | 88% | 66% |
| | SD | | 0.36 | 0.4 | | 0.35 | 0.39 | | 0.23 | 0.32 | | 0.18 | 0.22 | 0.38 |
| Harvest, in kg | Mean | 312 | 600 | 216 | 560 | 1009 | 470 | 1038 | 1060 | 1728 | 1099 | 1831 | 1896 | 483 |
| | SD | 743 | 1725 | 459 | 804 | 3022 | 1075 | 1858 | 1049 | 2094 | 1878 | 1469 | 1907 | 1383 |
| Size (ha) | Mean | 0.63 | 0.5 | 0.53 | 0.67 | 0.52 | 0.5 | 0.72 | 0.62 | 0.64 | 0.84 | 0.52 | 0.54 | 0.59 |
| | SD | 0.3 | 0.22 | 0.23 | 0.28 | 0.21 | 0.21 | 0.29 | 0.27 | 0.33 | 0.26 | 0.26 | 0.38 | 0.28 |
| Land productivity (kg/ha) | Mean | 827 | 1434 | 440 | 1104 | 1659 | 607 | 1802 | 1880 | 1422 | 1880 | 2694 | 2082 | 1030 |
| | SD | 3108 | 7743 | 848 | 1596 | 6680 | 1116 | 2624 | 1184 | 1145 | 2069 | 3938 | 1794 | 4522 |
| Labor productivity (kg/day) | Mean | 5.05 | 5.41 | 1.95 | 10.64 | 8.27 | 2.63 | 33.33 | 27.68 | 22.34 | 63.07 | 99.19 | 52.57 | 6.79 |
| | SD | 17.8 | 13.18 | 9.76 | 33.55 | 23.4 | 6.52 | 58.38 | 33.77 | 23.85 | 103.38 | 128.1 | 93.2 | 23.98 |

Source: IHS3, authors' calculations

## Main orientation of the agricultural production

Looking at the main orientation of agricultural production can help disentangle the groups.

To do so, we classify the groups into two main categories: staple crops (maize, cassava, vegetables, leguminous, groundnuts, rice and fruits) and export crops (tobacco, cotton, tea, coffee and paprika).

We find that (i) the subsistence groups mostly grow staple crops (as expected) and (ii) only 16 households out of 10,158 are only oriented toward export crops. The groups selling more than 50% differ from the other groups selling, they tend to grow more both staple and export crops.

**Table 1.2.4: Main orientation of production across the 12 types**

| Category | FF1 0 | FF1 <50% | FF1 ≥50% | FF2 0 | FF2 <50% | FF2 ≥50% | PF1 0 | PF1 <50% | PF1 ≥50% | PF2 0 | PF2 <50% | PF2 ≥50% | Total nb HHs | Share of total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | | |
| Only staple crops | 98% | 73% | 52% | 99% | 75% | 47% | 99% | 92% | 71% | 100% | 79% | 50% | 8 468 | 83% |
| Only export crops | 0% | 0% | 1% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 19% | 16 | 0% |
| Both staple and export | 2% | 27% | 47% | 1% | 25% | 53% | 1% | 8% | 29% | 0% | 21% | 31% | 1 674 | 16% |
| Total | 4 326 | 1 995 | 1 039 | 1 016 | 816 | 590 | 195 | 52 | 28 | 71 | 14 | 16 | 10 158 | 100% |
| | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 100% | | |

Source: IHS3, authors' calculations

To better understand the technico-orientation of the holdings, we then subdivided staple crops into three groups: (i) cassava and maize, (ii) leguminous and (iii) rice, vegetables, groundnut and fruits. The subsistence groups are less engaged in leguminous cultures. The diversification of crops in terms of the orientation of the productions is more important, within groups, for the holdings selling less than 50% of their production.

**Table 1.2.5: Diversification of crops across the 12 types**

| Category | FF1 0 | FF1 <50% | FF1 ≥50% | FF2 0 | FF2 <50% | FF2 ≥50% | PF1 0 | PF1 <50% | PF1 ≥50% | PF2 0 | PF2 <50% | PF2 ≥50% | Total nb holdings |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | |
| Cassava maize | 96% | 99% | 97% | 99% | 99% | 99% | 96% | 100% | 96% | 94% | 100% | 81% | 97% |
| Leguminous | 46% | 67% | 59% | 50% | 71% | 72% | 37% | 54% | 43% | 21% | 64% | 25% | 55% |
| Other (fruits, veg, groundnut,rice) | 42% | 52% | 38% | 38% | 51% | 36% | 38% | 54% | 36% | 18% | 57% | 19% | 43% |
| Tobacco | 0% | 23% | 40% | 1% | 22% | 47% | 0% | 6% | 29% | 0% | 7% | 44% | 14% |
| Cotton | 1% | 5% | 8% | 0% | 3% | 6% | 1% | 2% | 0% | 0% | 14% | 6% | 3% |

Source: IHS3, authors' calculations

## Crop diversification

We also look at the specialization/diversification profile of holdings in two ways, first with the number of crops cultivated and through a computed Herfindhal's index that accounts for the specialization.

The insight into the holdings with only one crop show different patterns between the subsistence family farm categories and the others. Indeed, more subsistence farms than commercial farms have declared in the interviews growing only one crop, with shares of 31 and 33%. Most of them are specialized in maize. Some family farms without hired labor (PF1) are also specialized in leguminous, with 5% of holdings as well as cassava that have important calorie intake. Lastly, 33% of holdings of the market oriented PF2 farms are specialized in tobacco that is one of the most important export crop in terms of representativeness and from previous supports from the government through the distribution of coupons.

Percentage of holdings growing only one crop, by culture

| | | FF1 | | | FF2 | | | PF1 | | | PF2 | | | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 0 | <50% | ≥50% | 0 | <50% | ≥50% | 0 | <50% | ≥50% | 0 | <50% | ≥50% | |
| | Only crop | 31 | 7 | 9 | 33 | 6 | 6 | 43 | 23 | 29 | 69 | 14 | 38 | |
| **Staple crops (if only one crop grown)** | Maize | 89 | 90 | 82 | 94 | 92 | 83 | 90 | 100 | 88 | 94 | 100 | 50 | 90 |
| | Gdnut | 0 | 2 | 1 | 0 | 0 | 6 | 0 | 0 | 13 | 0 | 0 | 0 | 0 |
| | Rice | 0 | 6 | 3 | 1 | 6 | 6 | 1 | 0 | 0 | 0 | 0 | 0 | 1 |
| | Leguminous | 5 | 0 | 5 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 4 |
| | Cassava | 2 | 0 | 0 | 3 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 2 |
| | Vegetables | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | Fruits | 0 | 0 | 0 | 1 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **Export crops (if only one crop grown)** | Tobacco | 0 | 2 | 5 | 0 | 0 | 6 | 0 | 0 | 0 | 0 | 0 | 33 | 1 |
| | Cotton | 0 | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 17 | 0 |
| | Paprika | | | | | | | | | | | | | 0 |
| | Other | | | | | | | | | | | | | 0 |
| | Coffee | | | | | | | | | | | | | 0 |
| | Tea | | | | | | | | | | | | | 0 |
| Livestock | | 31 | 44 | 42 | 44 | 52 | 53 | 27 | 42 | 63 | 16 | 50 | 17 | 35 |

Source: IHS3, authors' calculations

We also computed a Herfindhal's index based on land use of the crops accounting for the specialization of holdings. It ranges from 0 for complete diversification to 1 for complete specialization. It is calculated as:

$$H= \sum_{i=1}^{n} p_i^2$$

Where $p_i$ is the proportion of the $i^{th}$ crop relative to the total land area.

Looking at the value of the Hertfindhal's index across labor and market groups, we find that the family farms are the most diversified with respect to their land endowments (Herfindhal's index of 0.60 for FF1 and 0.58 for FF2). The index of the FF1 is close the FF2 but there is still statistical difference in means (at a risk error of 1%).

**Table 1.2.7: Herfindhal's index across the labor category**

| | FF1 | FF2 | PF1 | PF2 | TOTAL | P>F | F |
|---|---|---|---|---|---|---|---|
| Mean | 0.60 | 0.58 | 0.70 | 0.79 | 0.60 | 41.76 | 0 |
| SD | 0.25 | 0.24 | 0.27 | 0.26 | 0.25 | | |

Source: IHS3, authors' calculations

The PF2 farms are the most specialized with the index equals to 0.79. The average value of the sample is 0.60 (to be expected since family farms represent 96% of the sample).

**Table 1.2.8: Herfindhal's index across the 12 types**

| | FF1 | | | FF2 | | | PF1 | | | PF2 | | | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 0 | <50% | ≥50% | 0 | <50% | ≥50% | 0 | <50% | ≥50% | 0 | <50% | ≥50% | |
| Mean | 0.67 | 0.50 | 0.53 | 0.68 | 0.50 | 0.50 | 0.72 | 0.61 | 0.68 | 0.85 | 0.55 | 0.75 | 0.60 |
| SD | 0.27 | 0.18 | 0.19 | 0.27 | 0.18 | 0.18 | 0.28 | 0.25 | 0.27 | 0.24 | 0.22 | 0.26 | 0.25 |

Source: IHS3, authors' calculations

Looking at the 12 types, we see that subsistence farms tend to be more specialized than the commercial farms of the same labor category. We also find the same tendency that we underlined by looking at the crop orientation (staple vs. commercial), that among commercial holdings, those who sell more than 50% of their crop production tend to be on average more specialized than the ones selling less than 50%.

The most specialized are the subsistence PF2.

## Equipments and productive inputs

Malawian households own little equipment and those are rudimentary. The equipment most found is the axe. Only 7 households of the sample had or used tractor. Less than 10% of the holdings (994) declared owning or having used an ox cart and ox plough.

**Table 1.2.9: Share of holdings having or using equipment last year**

Percentage of holdings having or using equipment, last year

| | FF1 | FF2 | PF1 | PF2 | Total |
|---|---|---|---|---|---|
| **Slasher** | 20% | 33% | 34% | 40% | 24% |
| **Axe** | 81% | 85% | 67% | 62% | 81% |
| **Sprayer** | 2% | 7% | 5% | 6% | 4% |
| **Panga Knife** | 73% | 78% | 67% | 62% | 74% |
| **Sickle** | 67% | 63% | 28% | 19% | 65% |
| **Treadle Pump** | 2% | 5% | 3% | 1% | 3% |
| **Watering Can** | 22% | 33% | 17% | 23% | 25% |
| **Tractor** | | | | | |
| **Ridger** | 0% | 1% | 0% | 1% | 0% |
| **Cultivator** | 0% | 0% | 0% | 1% | 0% |
| **Generator** | 0% | 0% | 1% | 0% | 0% |
| **Motorised Pump** | 0% | 0% | 1% | 1% | 0% |
| **Grain Mill** | 0% | 1% | 1% | 2% | 1% |
| **Ox Carts** | 8% | 17% | 7% | 4% | 10% |

Source: IHS3, authors' calculations

The family farms with hired labor (FF2) have the higher share of households owning or using equipment. The family farms without hired labor (FF1) own the most sickles. It is important to note that the patronal farms are the less equipped in axe, panga knife, sickle and treadle pump.

Concerning productive inputs, non-organic fertilizer is the most used with 89% of holdings using some, compared with 20% for organic fertilizer. Only 3% of holdings use herbicides. The groups with the lowest share of households using fertilizers are the subsistence FF1 and the PF1 with a share of marketing greater than 50%.

However, the pattern of intensity of fertilizer use is different and it is the PF2 with a share of marketing greater than 50% that use it the most intensively (kg/ha).This category also has the highest access to extension services**.** This result is striking as its maize yield is not so high. But, the use of fertilizer is dependent on soil quality (Smale et al. 2013).

It is also apparent in the table, that the subsistence categories have a lower access to extension services.

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**Table 1.2.10: Input use across the 12 types**

| | | FF1 | | | FF2 | | | PF1 | | | PF2 | | | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 0 | <50% | ≥50% | 0 | <50 | ≥50 | 0 | <50% | ≥50% | 0 | <50% | ≥50% | |
| **Use of inputs** | | | | | | | | | | | | | | |
| **Orga ferti (% sample)** | Yes | 14 | 21 | 22 | 19 | 21 | 26 | 14 | 16 | 14 | 11 | 14 | 6 | 20 |
| **Fertilizers (% sample)** | Yes | 83 | 90 | 89 | 93 | 97 | 95 | 97 | 98 | 89 | 94 | 93 | 94 | 89 |
| **Herbicides (% sample)** | Yes | 2 | 4 | 5 | 1 | 4 | 6 | 1 | 0 | 4 | 2 | 0 | 0 | 3 |
| **Orga qu (kg)** | Mean | 16 | 15 | 16 | 29 | 22 | 27 | 131 | 13 | 0 | 23 | 0 | 3 | 21 |
| | Freq | 3323 | 1793 | 964 | 936 | 777 | 570 | 183 | 51 | 28 | 66 | 14 | 16 | 8721 |
| **Orga qu size (kg/ha)** | Mean | 27 | 14 | 23 | 64 | 15 | 15 | 97 | 16 | 0 | 35 | 0 | 1 | 27 |
| | SD | 273 | 100 | 407 | 995 | 96 | 154 | 94 | 66 | 0 | 264 | 0 | 4 | 414 |
| | Freq | 3316 | 1791 | 963 | 935 | 776 | 570 | 182 | 50 | 28 | 66 | 14 | 16 | 8707 |
| **Qu ferti (kg)** | Mean | 76 | 107 | 133 | 124 | 172 | 261 | 169 | 160 | 518 | 144 | 333 | 416 | 122 |
| | Freq | 53 | 194 | 145 | 141 | 248 | 337 | 221 | 128 | 708 | 145 | 311 | 237 | 184 |
| **Qu size ferti (kg/ha)** | Mean | 122 | 116 | 132 | 164 | 129 | 173 | 200 | 187 | 240 | 265 | 289 | 289 | 135 |
| | SD | 173 | 289 | 174 | 251 | 114 | 303 | 165 | 158 | 177 | 218 | 523 | 150 | 220 |
| | Freq | 2763 | 1604 | 854 | 868 | 757 | 542 | 177 | 49 | 25 | 62 | 13 | 15 | 7729 |
| **Herbi qu (L)** | | 0 | 0 | 0 | 0 | 9 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| **Access to extension services last year** | % | 42 | 52 | 54 | 46 | 53 | 61 | 46 | 58 | 71 | 46 | 50 | 56 | 48 |

Source: IHS3, authors' calculations

# Appendix 1.3: Livestock

Beside agricultural practices, livestock is also an important determinant of the orientation of the holdings. 54% of the holdings in Malawi own some livestock, 65% of the family farms with hired labor (FF2) and only 51% for those without labor (FF1). Only 44% and 38% of PF1 and PF2, respectively, have livestock. However the index shows that it is the PF2 that own the higher amount of livestock (with the most bovines) and they sell at least 50% of their production.

**Table 1.3: Possession of livestock and quantity of livestock across the 12 types, by kind**

| | | FF1 | | | FF2 | | | PF1 | | | PF2 | | | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 0 | <50% | ≥50% | 0 | <50% | ≥50% | 0 | <50% | ≥50% | 0 | <50% | ≥50% | |
| **Livestock** | Yes | 43% | 63% | 62% | 55% | 70% | 75% | 38% | 56% | 68% | 28% | 64% | 56% | 54% |
| **Bovine** | Mean | 0.45 | 0.52 | 0.29 | 0.78 | 1.10 | 0.95 | 2.57 | 0.24 | 0.79 | 0.15 | 0.78 | 5.78 | 0.62 |
| | SD | 2.89 | 2.27 | 1.45 | 3.36 | 9.05 | 3.05 | 17.22 | 1.30 | 2.37 | 0.67 | 1.99 | 14.45 | 4.34 |
| **Ovine** | Mean | 1.51 | 1.79 | 1.90 | 2.19 | 2.60 | 3.07 | 2.43 | 2.55 | 3.32 | 1.85 | 0.56 | 0.67 | 1.95 |
| | SD | 2.93 | 3.83 | 3.08 | 4.27 | 4.38 | 4.02 | 4.27 | 3.64 | 3.22 | 2.60 | 1.33 | 2.00 | 3.62 |
| **Pig** | Mean | 0.39 | 0.67 | 0.70 | 0.61 | 1.01 | 0.99 | 1.04 | 0.69 | 1.63 | 0.05 | 2.22 | 0.00 | 0.64 |
| | SD | 1.49 | 1.92 | 2.15 | 2.05 | 2.72 | 2.47 | 3.27 | 1.91 | 5.82 | 0.22 | 4.32 | 0.00 | 2.04 |
| **Poultry** | Mean | 5.85 | 6.90 | 6.27 | 8.31 | 8.88 | 8.58 | 10.12 | 8.72 | 24.05 | 6.60 | 10.00 | 7.22 | 7.06 |
| | SD | 8.02 | 7.91 | 6.45 | 9.31 | 9.79 | 9.83 | 10.83 | 7.67 | 79.16 | 5.28 | 10.01 | 8.51 | 9.63 |
| **Mean index (*)** | | 75 | 90 | 68 | 123 | 164 | 153 | 312 | 74 | 177 | 47 | 126 | 599 | 102 |

Source: IHS3, authors' calculations
(*) Mean index based on (Nyirenda et al. 2000).

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# Appendix 1.4: Socio-economic variables

Lastly, some socio economic variables have been checked. PF2 have the highest access to credit. But interestingly more FF2 have access to credit than PF1, even looking at the commercial sub-groups.

Regarding the age of the household head, we find an average 8 years difference between the youngest and oldest sub-groups of holdings. The subsistence family farms are on average the oldest (44 years old). Comparatively, the youngest household heads are found for the commercial patronal farms selling more than half their crop production (36 years old for PF1 and 37 years old for PF2).

As for gender, overall, most holdings are male headed (75%), and the share of male headed is positively correlated with the share of crop sold and education level of household head. As a consequence, there is more female headed households in the subsistence family farms. Interestingly the highest share of female headed households is found in the PF1 selling between 0 and 50% of their crops. Those groups also have household heads with a lower education levels than the other groups from the same labor category.

Interestingly, education level of household head is gradually increasing across the labor and marketing categories.

Education level is an important variable since it is one of the mean to get nonagricultural employment opportunities which in some context, as in Malawi, is key to ensure incomes and food security of the household (Byerlee, de Janvry and Sadoulet 2009).

**Table 1.4.1: Socio economic statistics across the 12 types**

|  |  | FF1 | | | FF2 | | | PF1 | | | PF2 | | | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
|  |  | 0 | <50% | ≥50% | 0 | <50% | ≥50% | 0 | <50% | ≥50% | 0 | <50% | ≥50% | |
| **Credit** | % | 9 | 13 | 16 | 16 | 19 | 18 | 11 | 15 | 11 | 20 | 21 | 25 | 13 |
| **Age** | Mean | 44.23 | 42.25 | 41.01 | 43.05 | 42.79 | 41.49 | 41.82 | 44.27 | 36.21 | 40.51 | 42.79 | 37.06 | 43.03 |
| **Gender** | Sh Male | 71 | 76 | 83 | 76 | 80 | 86 | 79 | 67 | 89 | 76 | 93 | 100 | 75 |
| **Hhsize** | Mean | 4.54 | 4.82 | 4.99 | 4.96 | 4.89 | 4.97 | 4.71 | 4.02 | 4.64 | 4.63 | 4.29 | 5.25 | 4.74 |
| **Active** | Mean | 2.23 | 2.31 | 2.45 | 2.48 | 2.38 | 2.49 | 2.54 | 1.87 | 2.43 | 2.76 | 2.57 | 2.94 | 2.33 |
| **Dependency ratio** | | 0.54 | 0.52 | 0.54 | 0.53 | 0.52 | 0.54 | 0.56 | 0.48 | 0.59 | 0.62 | 0.63 | 0.58 | 0.53 |
| **Education** | Yes | 68% | 78% | 79% | 86% | 88% | 89% | 90% | 87% | 93% | 94% | 86% | 100% | 76% |

Source: IHS3, authors' calculations

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## Off-farm work with respect to on farm work

According to Ellis 2000 "*the pervasive and enduring character of [economic] diversification*" is intrinsic in Malawi.

We do not define a threshold of the off-farm revenues because it may hide the heterogeneity in the kind of work done, especially as diversification "*obeys a continuum of causes and motivations and constraints that vary across individuals and households at a particular point in time and for the same individuals or households at different points in time*" (Ellis 2000).

We consider that the incomes from off-farm work are part of the financial asset. However, it must be reminded that the Malawian typology reflects in many respects livelihood profiles. But at that stage we haven't taken into account the type of off-farm work nor their diversity as discriminating variables among the groups, although they may be decisive.

Despite its importance, the data would not allow a proper analysis of the distinction between the choice and the necessity of diversification.

We did look at the time spent off-farm, in days, with respect to the time on farm. Looking at the share of households, by category, that spends more time on off-farm work, we find that subsistence oriented categories spend more time off-farm than other categories (keeping in mind that PF2 have not declared working on farm).

## Level of income: possession of durable goods

We use the variable of the possession of durable goods as a proxy for wealth level. This variable includes: mortar, furniture (table, chair), radio, TV, sewing machine, kerosene stove, refrigerator, washing machine, bicycle, scooter, car, computer, solar panel and generator. Two questions were asked to the households: whether they own any of it, and if yes, what was the estimated value of each good owned.

The labor and market categories seem to be related to the wealth profiles to the extent that the share of farms owning some durable goods are positively correlated with rising share of hired labor and increasing crop production sold. The average value of durable goods owned is correlated with the labor category, but not directly with the market orientation: for each labor category the holdings who sell between 0 and 50% of their crops own on average less valuable durable goods than the others. Furthermore for all family farms and the PF1, the subsistence category owns on average more durable goods than the other ones. We saw earlier those where also the households with the oldest household heads.

**Table 1.4.2: Share of holdings owning durable goods and their estimated value across the 12 types**

| | | FF1 | | | FF2 | | | PF1 | | | PF2 | | | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 0 | <50% | ≥50% | 0 | <50% | ≥50% | 0 | <50% | ≥50% | 0 | <50% | ≥50% | |
| **Possession of durable goods** | Sh owning some | 78% | 85% | 87% | 91% | 95% | 94% | 97% | 98% | 100% | 94% | 100% | 100% | 84% |
| | Mean value | 8.7 | 6.7 | 6.7 | 41.2 | 24.1 | 30.7 | 145.2 | 47.4 | 111.9 | 292.9 | 166.0 | 352.3 | 19.8 |
| | SD value | 56.1 | 21.3 | 10.0 | 154.2 | 75.8 | 131.4 | 320.0 | 71.0 | 181.2 | 618.4 | 406.0 | 566.3 | 109.4 |

Source: IHS3, authors' calculations

## Urban households

**Table 1.4.3: Share of holdings and estimated value of durable goods owned across the 12 types by urban/rural**

| | | FF1 | | | FF2 | | | PF1 | | | PF2 | | | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 0 | <50% | ≥50% | 0 | <50% | ≥50% | 0 | <50% | ≥50% | 0 | <50% | ≥50% | |
| **Rural** | % yes | 93 | 98 | 98 | 78 | 94 | 96 | 44 | 71 | 89 | 30 | 71 | 50 | 91 |
| **Durable if rural** | Freq. | 4117 | 1845 | 1022 | 827 | 728 | 568 | 85 | 37 | 25 | 21 | 10 | 8 | 9293 |
| | Mean | 6.0 | 6.6 | 6.7 | 23.2 | 21.0 | 30.2 | 75.4 | 32.9 | 87.6 | 77.2 | 39.4 | 210.4 | 11.7 |
| | SD | 27.6 | 21.3 | 10.0 | 72.7 | 63.9 | 131.9 | 220.7 | 47.8 | 153.3 | 203.8 | 90.0 | 488.5 | 56.9 |
| **Durable if urban** | Freq. | 314 | 45 | 17 | 227 | 50 | 22 | 110 | 15 | 3 | 50 | 4 | 8 | 865 |
| | Mean | 44.2 | 10.6 | 7.7 | 106.8 | 69.2 | 45.1 | 199.1 | 83.3 | 314.5 | 383.5 | 482.6 | 494.1 | 106.7 |
| | SD | 182.1 | 19.3 | 9.7 | 293.2 | 168.5 | 117.1 | 371.5 | 102.8 | 303.3 | 707.8 | 709.1 | 634.5 | 312.5 |

Source: IHS3, authors' calculations

# Appendix 1.5: Public policies

Since 2005, the Fertiliser Input Subsidy Program (FISP) distributes coupons for productive inputs (fertilizer and seeds) to some households. In the data, 54% of holdings receive coupons, which is coherent with the national statistics (Pauw and Thurlow 2014). The commercial family farms have the higher share of holdings receiving the coupons, followed by the commercial PF1, but some of the PF2 do receive some coupons as well.

In the case of the safety nets, the subsistence FF1 and FF2 have the highest share of households receiving them. However, both the PF1 and PF2 also receive some.

**Table 1.5: Public policies across the 12 types**

| | | FF1 | | | FF2 | | | PF1 | | | PF2 | | | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 0 | <50% | ≥50% | 0 | <50% | ≥50% | 0 | <50% | ≥50% | 0 | <50% | ≥50% | |
| **Coupon** | % | 48 | 62 | 61 | 51 | 68 | 63 | 32 | 50 | 54 | 17 | 21 | 13 | 54 |
| **Coup if** | % | 49 | 63 | 61 | 57 | 69 | 64 | 47 | 57 | 56 | 14 | 30 | 25 | 56 |
| **Coup if** | % | 33 | 42 | 65 | 30 | 54 | 41 | 20 | 33 | 33 | 18 | 0 | 0 | 32 |
| **N° of coupons get** | Mean | 1.00 | 1.37 | 1.27 | 1.14 | 1.56 | 1.46 | 0.70 | 1.19 | 1.07 | 0.39 | 0.50 | 0.25 | 1.17 |
| **N° if yes** | Nb of | 2115 | 1179 | 631 | 537 | 527 | 371 | 62 | 26 | 15 | 12 | 3 | 2 | 5480 |
| | mean | 2.10 | 2.19 | 2.10 | 2.24 | 2.30 | 2.32 | 2.19 | 2.38 | 2.00 | 2.33 | 2.33 | 2.00 | 2.17 |
| **Safety net** | % | 21 | 16 | 15 | 18 | 15 | 16 | 14 | 15 | 11 | 4 | 0 | 6 | 18 |
| **Sum safety net** | Freq. | 911 | 307 | 156 | 192 | 114 | 95 | 28 | 8 | 3 | 3 | 1 | | 1818 |
| | Mean | 1219 | 1731 | 1274 | 1598 | 1577 | 2471 | 1054 | 2300 | 0 | 1500 | 0 | | 1438 |
| | SD | 7835 | 10149 | 4026 | 5634 | 3553 | 9024 | 2891 | 3829 | 0 | 2598 | 0 | | 7623 |
| **Free maize** | % | 2.93 | 2.01 | 2.12 | 1.14 | 1.41 | 2.20 | 1.54 | 0.00 | 0.00 | 1.41 | 0.00 | 0.00 | 2.26 |
| **Sum free maize kg** | Freq. | 911 | 307 | 156 | 192 | 114 | 95 | 28 | 8 | 3 | 3 | 1 | | |
| | Mean | 12 | 12 | 14 | 9 | 6 | 14 | 21 | 0 | 0 | 17 | 0 | | 12 |
| | SD | 46 | 42 | 48 | 63 | 30 | 50 | 95 | 0 | 0 | 29 | 0 | | 48 |

Source: IHS3, authors' calculations

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# APPENDIX 2: Uses of crop produced

**Table 2.1: Uses of the crops produced**

| Share of HH using part of their crop production by use | A. Autarkic family farms | B. Commercial pure family farms | C. Commercial family farms with hired labor | D. Subsistence patronal farms | E. Commercial patronal farms | Total |
|---|---|---|---|---|---|---|
| At least one alternative use of harvest (exc. post harvest losses) | 44% | 67% | 74% | 44% | 71% | 55% |
|   - given as gifts | 15% | 22% | 34% | 23% | 32% | 20% |
|   - used as reimbursement of inputs borrowed or acquired on credit | 1% | 2% | 4% | 0% | 5% | 2% |
|   - used as animal feed | 0% | 0% | 1% | 0% | 0% | 0% |
|   - used as inputs for by products | 2% | 1% | 2% | 0% | 4% | 1% |
|   - saved for seed | 35% | 58% | 63% | 31% | 56% | 46% |
|   - post hvest losses | 8% | 9% | 12% | 6% | 13% | 9% |
| Used as gifts and inputs | 0% | 1% | 2% | 0% | 4% | 1% |
| Used as gifts or inputs | 16% | 23% | 36% | 23% | 34% | 21% |
| No gifts, no inputs, not sold | 84% | 0% | 0% | 77% | 0% | 46% |

Source: author's computation from IHS3

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