THE AGRICULTURAL INTEGRATED SURVEY (AGRIS): RATIONALE, METHODOLOGY, IMPLEMENTATION

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ABSTRACT

The Agricultural Integrated Survey (AGRIS) is a farm-based modular multi-year survey program. The AGRIS methodology is being finalized by FAO in the context of the Global Strategy to improve Agricultural and Rural Statistics. AGRIS complements other relevant initiatives such as the World Bank LSMS-ISA and aims to scale-up these global efforts. AGRIS implementation is just starting with partner countries.

AGRIS is designed as a cost-effective way for national statistical agencies to accelerate the production of quality disaggregated data on the technical, economic, environmental and social dimensions of agricultural holdings. The data generated is meant to inform policy design and implementation, as well as improve market efficiency and support research. AGRIS constitutes an invaluable data source and provides the framework for designing, monitoring and evaluating any agricultural and rural policy or investment. AGRIS is designed to be particularly relevant for developing countries. Together with the agricultural census which it complements, a versatile agricultural market information system, and an appropriate use of remote sensing and administrative data, AGRIS is a cornerstone for the establishment of a comprehensive rural information system.

National agencies that are willing to design and implement a customized AGRIS will find in the AGRIS Toolkit the necessary resources in terms of (1) technical methodology, (2) specialized survey tools and instruments that use the latest knowledge and technology and cover the full range of survey steps, and (3) budget and institutional framework guidelines. Currently, FAO and its partners are scaling up a network of expertise, especially at regional level, to provide the necessary training, technical assistance and funding opportunities.

Keywords: agricultural integrated surveys, farm level data collection, modular approach, SDG, FAO guidelines

1. Rationale

3.1 The need for more, better, cheaper and faster statistical data in the agricultural and rural sector generally is widely recognized. While some progress on accessing existing information has been made in recent years, thanks to the traction of the open data movements, critical gaps on data production still remain in many countries. These gaps are largely explained by an absence of quality data collection, whether censuses or surveys. Some countries have yet to successfully leverage the technical and institutional innovations available for the industrialization of statistical production. Indeed, the majority of IDA countries1 have not conducted any agricultural annual surveys or censuses over the last 15 years, as shown in the table below:

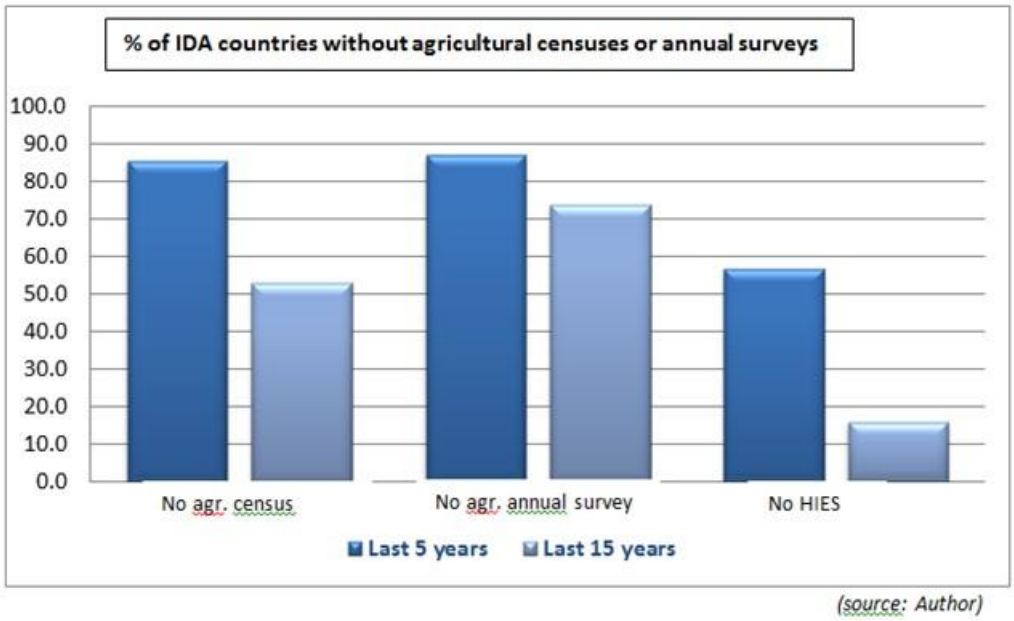

Figure 1: *The lack of agricultural surveys and censuses in IDA countries*

3.2 The Global Strategy to Improve Agricultural and Rural Statistics was endorsed in 2009 by the United Nations Statistical Commission, to address these concerns relating to poor data availability or quality, and the lack of capacity in developing countries. The Global Strategy is a coordinated effort to provide a conceptual and institutional framework for the production of data, to establish a Minimum Set of Core Data (MSCD) required to meet the current and emerging demands of national development policies, to develop cost-effective methodologies for data production and use, and to establish the necessary governance structures and capacities.

[1] http://www.worldbank.org/ida/borrowing-countries.html

3.3 As one of the main features of cost-effective methods, the Agricultural Integrated Survey (AGRIS) is designed to help national agencies accelerate the production of quality disaggregated data on the technical, economic, environmental and social dimensions of agricultural holdings[2]. AGRIS builds on the previous work of the Global Strategy and presents a unique opportunity to channel these methodological innovations, and to have a real impact on data systems on the ground.

3.4 The data generated by AGRIS is meant to inform policy design and implementation, improve market efficiency and support research. AGRIS constitutes an invaluable data source and provides the framework for designing, monitoring and evaluating any agricultural and rural policy or investment. The proposed generic set of AGRIS questionnaires will generate 65% of the MSCD data requirements. It will also provide basic data for monitoring the relevant SDGs. AGRIS provides essential and direct information for the following 6 SDG indicators: 2.3.1 / 2.3.2 / 2.4.1 / 5.4.1 / 5.a.1.a / 5.a.1.b. Additionally, AGRIS provides essential but indirect information for the following 16 SDG indicators: 1.1.1 / 1.2.1 / 1.2.2 / 1.3.1 / 1.4.1 / 1.4.2 /2.5.1 / 2.5.2 / 5.b.1 / 7.1.1 / 8.5.1 / 8.5.2 / 8.7.1 / 8.8.1 / 9.1.1 / 17.8.1. Finally, AGRIS is expected to generate the flow of quality data required to monitor regional policy frameworks, such as the African Union Comprehensive Africa Agriculture Development Programme (CAADP).

3.5 AGRIS, being a 10-year integrated survey program, lays the foundations for the creation of an efficient agricultural statistical system. Together with the agricultural census which it complements, a versatile agricultural market information system, and an appropriate use of remote sensing and administrative data, AGRIS is a cornerstone for the establishment of a comprehensive rural information system.

3.6 Without AGRIS, existing data gaps can only be filled by ad-hoc suboptimal mechanisms with high transaction costs. This would further increase the burden on people, agricultural holdings and data systems, and would not guarantee the data quality required by users. Ultimately, this would prevent any monitoring of these policy frameworks and would constitute an obstacle to the accountability and transparency required by functioning markets.

2. Methodology

2.1 The AGRIS methodology is being developed by FAO in the context of the Global Strategy. Some activities involve partner agencies, for example the World Bank and ILO. Research and testing is also conducted with national agencies on an ad-hoc basis.

[2] "An agricultural holding is an economic unit of agricultural production under single management comprising all livestock kept and all land used wholly or partly for agricultural production purposes, without regard to title, legal form, or size. Single management may be exercised by an individual or household, jointly by two or more individuals or households, by a clan or tribe, or by a juridical person such as a corporation, cooperative or government agency. The holding's land may consist of one or more parcels, located in one or more separate areas or in one or more territorial or administrative divisions, providing the parcels share the same production means, such as labour, farm buildings, machinery or draught animals." From FAO, WCA 2020.

Overall data collection strategy

2.2 AGRIS is synchronized with the Agricultural Census and operates over a 10-year cycle. AGRIS proposes to decrease the burden of conducting censuses by scheduling the collection of thematic data (e.g. non-structural data) over this time frame. This will contribute to a more regular flow of data, which would be more in line with the limited capacities currently in place for the production and use of statistics.

2.3 AGRIS consists of a collection of questions that can be classified in one of two main categories: a core section and a rotating section. The core section (also referred to as the 'core' or 'core module') focuses on a range of different themes that remain largely the same in each survey round. The rotating section ('rotating modules') is devoted to specific themes, the implementation frequency of which will vary among countries with different agricultural systems and data demand priorities.

2.4 The following table summarizes a possible modules flow for the four recommended modules: 'economy', 'labour force', 'machinery and equipment', and 'production methods and environment'. The financial and human resources input required to sustain and implement such a set-up is relatively stable over the 10 year cycle, making it a viable set-up for a data producing agency. The targeted annualized budget for an IDA country for such a set-up is within the USD1m – 1.5m range. The flexible, modular nature of AGRIS makes it easy to modify this proposed setting and thus enhance its national relevance and its cost-effectiveness. Additional rotating modules may also be added to respond to additional specific data needs.

	Years	0	1	2	3	4	5	6	7	8	9	10
Agricultural Census		●										
AGRIS Core Module	AH Roster		●	●	●	●	●	●	●	●	●	●
	Crop production		●	●	●	●	●	●	●	●	●	●
	Livestock production		●	●	●	●	●	●	●	●	●	●
AGRIS Rot. Module 1	Economy				●		●		●		●	
AGRIS Rot. Module 2	Labour force			●				●				●
AGRIS Rot. Module 3	Machinery and equipment					●				●		
AGRIS Rot. Module 4	Production methods and environment				●			●				●

Figure 2: *Proposed AGRIS modules flow*

2.5 In order to provide timely information for market efficiency and decision making, data collection should be conducted several times during the year. This is particularly true for the Core Module in countries with several crop periods. Rotating Modules, in particular the Economy and Labour Force modules, could also require several waves of data collection in their years of implementation. Sub-sampling plans could be used to accommodate budget constraints, while producing more frequent data with different levels of statistical significance.

2.6 Survey-to-survey imputation methods can be a cost-effective way to fill some of the data gaps in the AGRIS scheme above, or between AGRIS and other relevant surveys (such as stand-alone labour force surveys). The key challenges for survey-to-survey imputation are that the

two types of surveys (or modules) must be designed in a similar way (including questions asked), and the model parameters must not change over time.

Data collection mode

2.7 In the context of developing countries, improving data quality, and in particular accuracy and timeliness, remains a top priority. Face-to-face interviews carried out by professionals enumerators remain the best means of quality data collection. When required, data collection could include the use of self-reported log-books (or SMS log-books), for example in the case of multiple harvest seasons or livestock data (Core Module), or cost of production (Rotating Module 1). The use of CAPI technologies is recommended, to improve data quality and timeliness. Add-on devices to the mobile CAPI-enabled platforms could be used to perform a number of direct measurements – whether geocoding and plot area measurements (GPS), or measurements relating to the environment (leaf cover indices, soil and water characteristics, etc.). Mixed-mode data collection will be piloted to ascertain the benefits of surveying a panel of household holdings by phone and a panel of non-household holdings by means of web questionnaires. The systematic use of the GPS coordinates of the location of holdings and plots is recommended, to accelerate the ground-truthing of complementary remote sensing information systems.

Sampling

2.8 The AGRIS sample techniques and sample size will be decided by the implementing national agencies, based on the sample frames available, the capacities to design and implement complex sampling techniques and corresponding field work, the budget available and the ultimate data accuracy and disaggregation required.

2.9 Specific and detailed sampling guidelines and tools are provided in the AGRIS Toolbox (see paragraph 27 below). These tools are based on the advanced research conducted by the Global Strategy on Multiple Frame Sampling and on the Integrated Survey Framework.

2.10 Different theoretical and practical issues relating to frames exist, and, in many countries, still limit surveying options and eventually reduce data quality and usability. These issues range from generic issues, such as frame coverage (for list frames in particular) to more specific issues, such as the poor accuracy of livestock statistics based on area frames. Guidance upon these matters will be provided in the AGRIS Toolkit.

2.11 The AGRIS sampling strategy is versatile, to be able to meet the different national situations. In a nutshell, the strategy is articulated around the following elements:

- Stratified multistage random sample for farms from the household sector, based on a list frame when relevant or on an area frame (points or segments)
- Stratified simple random sample for farms of the non-household sector
- Panel sampling to enable longitudinal analyses
- Subsampling for rotating modules

2.12 Seasonality is a key dimension in agriculture. Right timing of data collection is of critical importance. The appropriate use of sub-samples and panels will allow AGRIS to capture some

of the seasonality factors. Methodological options to administer data collection only once or several times a year are provided - both for the core and the rotating modules.

Topics covered and data items

2.13 AGRIS covers different technical, economic, environmental and social dimensions of agricultural holdings through its core module and its 4 rotating modules: 'economy', 'labour force', 'machinery and equipment', and 'production methods and environment'. The following tables list the proposed data items for each module. The AGRIS Toolkit further details these data items and proposes corresponding generic questionnaires.

2.14 AGRIS collects sex-disaggregated data on key topics, through both the core and the rotating modules. This entails a more refined identification of male and female headed households, and will help to assess women's contribution to agriculture through labour and their access to and control of productive assets, resources and services.

2.15 Different series of generic questionnaires will be proposed for the AGRIS core module, to capture the variety of farming systems worldwide. The core module will collect data on the following topics:

CORE MODULE

1. Ide ification and general characteristics of the holding
2. emographics and social characteristics *[HS-AH only]*
Demographics Social protection : safety nets Social protection : transfers / gifts
3. olding housing infrastructure and key assets *[HS-AH only]*
4. ccess to markets and information
Access to agricultural markets Access to information
5. Pro ction Methods and Environment
6. abour
Labour input on the holding Work force availability
7. conomy
Access to finance
8. gricultural Productions
Crops: temporary crops Crops: temporary crops, next campaign Crops: permanent crops Livestock Milk, eggs and other animal productions Aquaculture and fisheries
9. Pro ction shocks and coping mechanisms

2.16 The four AGRIS rotating modules will collect data on the following topics:

ROTATING MODULE 1: ECONOMY

1. ans of production (no labour)

Land tenure Property of livestock Storage capacity
2. In me
Total income Income from agricultural activities Income from other gainful activities Subsidies/aid received
3. osts of production
Linked to crop production Linked to livestock production Salaries Insurance Linked to other gainful activities
4. M n commercial networks for the production
5. redit and access to financing
6. ccess to information and other issues

ROTATING MODULE 2: LABOUR FORCE

1. ousehold members' contribution to the agricultural holding (HH sector only)
Basic demographics information Participation in agricultural activities of the AH (incl. salary/wages; employment/own use production, etc.) Participation in diversification activities of the AH (incl. salary/wages; employment/own use production, etc.) Participation in other activities (incl. unpaid domestic activities, care, other activities related to own family AH) Managerial role in the agricultural activities on the AH
2. ousehold members' other working activities - diversification (HH sector only)
3. ired labour of the AH (HH and non HH sectors)
Basic demographic information Participation in agricultural activities (incl. salary/wages) Participation in diversification activities of the AH (incl. salary/wages) Wages / labour cost Work conditions (incl. decent work, informality, etc.)
4. ther labour force used in the AH (HH and non HH sectors)
Non-permanent employees (seasonal) Agricultural work carried out by a specialised company Other labour force

ROTATING MODULE 3:MACHINERY AND EQUIPMENT
(Types and quantities in use, access and ownership)

1. M hinery and Equipment - types & quantities in use, access & ownership
Manually operated equipment
Animal powered equipment
Machines for general farm use
Tractors, bulldozers and other vehicles
Land preparation and planting machinery and equipment
Crop maintenance machinery and equipment
Crop harvesting machinery and equipment
Post-harvest machinery and equipment
Livestock machinery and equipment
Aquaculture machinery and equipment
Energy production machinery and equipment
Storage and marketing machinery and equipment
Water management machinery and equipment
2. ontractors and services, activities
3. istribution of Managerial Decisions in the holding

ROTATING MODULE 4: PRODUCTION METHODS & ENVIRONMENT
(Quantities, types and areas)

1. Use of Natural Resources
Land use
Energy sources
Soil management
Irrigation and drainage
2. Crops production systems and resources
Fertilizers
Plant protection products
Crops and seeds varieties and resources
Rice cultivation, specificities
Type of non-residential buildings
3. Livestock production systems and resources
Type of livestock production system
Livestock types and resources
Animal breeding and reproduction
Animal housing, manure management, equipment and transportation of animals
Veterinary products and use of traditional medical methods
Feed and use of pastures
4. On farm processing of agricultural products and by-products
5. Organic farming (certified or in conversion to organic)
6. Agro forestry
7. Access to and use of services, infrastructure and natural resources
Agricultural extension services (incl. veterinary)
Infrastructure (incl. IT, communications, access to market)
Access to natural and common property resources
8. Greenhouse gas and environment
9. Adaptation to climate change and mitigation strategies
10. Waste Management

2.17 The AGRIS Toolkit provides additional resources to guide in the design and customization of the questionnaires. Specific guidelines will synthetize costs/benefits dimensions of different options for the sequencing of the rotating modules, for different farming systems.

Data access

2.18 When AGRIS is initiated at country level, a detailed release calendar will be published by the national agencies responsible, to announce the survey outputs available to each category of users, and under which conditions. This release calendar shall be user friendly and consistent with both the national dissemination policy in place and the international best practices (such as open data protocols).

2.19 FAO will maintain a DDI-compliant[3] AGRIS Central Catalog, in line with the practices of and tools made available by the International Household Survey Network4. In addition to all relevant metadata, questionnaires and survey outputs, the AGRIS Central Catalog will provide easy and safe access to anonymized microdata, for research purposes. The exact access terms for each survey dataset will be agreed between national agencies and FAO, and will fall under either of two categories: "public use file" and "licensed file". When anonymized microdatasets cannot be made available, the catalog will still provide detailed metadata at the variable level. The AGRIS Central Catalog will be connected to the national catalogs and to relevant international catalogs such as the World Bank Microdata Catalog or the IHSN Central Survey Catalog, for automatic harvesting and data exchanges. National agencies will have access to detailed usage statistics on their own products.

2.20 The AGRIS Central Catalog will be critical for ensuring long-term preservation of and access to AGRIS resources.

2.21 Partnerships with local universities will be recommended, to build the long-term capacity to understand and use complex microdatasets and the associated econometrics techniques. This is expected to increase statistical literacy, fuel research and inform civil society on policy choices.

The AGRIS Toolkit

2.22 The national agencies that are willing to design and implement a customized AGRIS will find, in the AGRIS Toolkit, the necessary resources in terms of (1) technical methodology, (2) the specialized survey tools and instruments that use the latest knowledge and technology, and that cover the full range of survey steps, and (3) budgetary and institutional framework guidelines.

2.23 The AGRIS Toolkit is being developed by FAO in consultations with partner agencies and external experts. These parties rely heavily on the research conducted and the guidelines produced within the framework of the Global Strategy. Customization of the generic survey tools to meet specific country data needs and statistical infrastructure is a prerequisite for a successful implementation. FAO and other partners can provide technical assistance and training in this process, as requested by national agencies.

[3] www.ddialliance.org/
[4] www.ihsn.org

2.24 The AGRIS Toolkit includes the following resources [*(*): draft resource available]*:

AGRIS planning and design [GSBPM[5] 1.x, 2.x, 3.x]	
	Planning AGRIS - Data needs assessment guidelines - Survey plan template - Supply and equipment procurement - Budget calculation template - AGRIS pre-test guidelines - Memorandum of Understanding template - AGRIS Governance : example of terms of reference - Quality management checklist Questionnaires - Indicator lists and data items: core and rotating modules (*) - Core and rotating modules: generic questionnaires (*) - Flow of modules guidelines - Guidelines for the customization of AGRIS questionnaires Sampling - AGRIS sampling theory and practice (*) - Sample frames: design, use and maintenance (*) - Sampling do programs / syntaxes (R, STATA and SPSS) - Sample size and sampling error calculation simulations - Sample weight calculation simulations
AGRIS data collection [GSBPM 4.x]	
	- CAPI solution for tablets and smartphones: software and training package (*) - Instructions for interviewers - Instructions for supervisors - Fieldwork checklist
AGRIS data processing [GSBPM 5.x]	
	- CAPI solution: software and training package (*) - PAPI: AGRIS generic questionnaires data entry application - Manual for AGRIS data processing - Data quality guidelines - Tabulation do programs / syntaxes (R, STATA and SPSS)
AGRIS data analysis [GSBPM 6.x]	
	- Generic tabulation plan - Sampling errors calculations - Analyses for the core module and the rotating modules: guidelines
AGRIS data dissemination [GSBPM 7.x]	
	- Final report and presentations template - AGRIS dissemination strategy guidelines and release calendar - Generic dissemination policy and implementation protocols - Guidelines on engaging with journalists - Dissemination workshop series: agenda and templates - IHSN NADA software and guidelines (*)
AGRIS data documentation and archiving [GSBPM cross-cutting]	
	- IHSN Microdata Management Toolkit: software and guidelines (*)

[5] http://www1.unece.org/stat/platform/display/metis/The+Generic+Statistical+Business+Process+Model

3. Implementation

National implementation

3.1 AGRIS is designed as a national survey program, implemented by national agencies under an official mandate to produce statistical data.

Alignment with national priorities and capacity-building

3.2 In the context of developing countries with limited statistical capacity, the priority is to respond to the demands that have already been expressed. In particular, 12 African countries have identified the design and implementation of AGRIS as a priority[6]. Alignment with national priorities as identified in national statistical strategies[7] and work programs will continue to be an overarching principle of AGRIS' implementation. AGRIS will strengthen national systems and will provide an opportunity for the enforcement of national and international standards, thus eventually contributing to the enhancement of statistical capacity and literacy.

3.3 FAO will proactively promote AGRIS in countries where this approach can fill some of the identified data gaps. When financial and/or technical assistance is required, customized work programs will be designed.

3.4 All agencies that are willing to design and implement AGRIS are encouraged to use the resources available in the AGRIS Toolkit, and to customize them to their specific needs. Agencies are encouraged to share survey outputs so that these too can be shared also through the AGRIS Central Catalog.

International coordination: the GRAInS Partnership

3.5 In addition to its involvement in the Global Strategy, FAO works closely with relevant international organizations and interagency groups. In particular, FAO works closely with other relevant survey programmes, such as the World Bank LSMS-ISA. FAO is also a member of the Inter Secretariat Working Group on Household Surveys (ISWGHS).

3.6 A multi-agency survey hub is being established in Rome, Italy, to advance the common goal of facilitating the production and use of household and farm survey data for evidence-based policymaking by improving survey methods, generating high-quality data, and strengthening statistical capacities in low and middle-income countries. In this respect, on 13 November 2015, FAO, the International Fund for Agricultural Development (IFAD), and the World Bank signed a Memorandum of Understanding as a first step towards a broader alliance on agricultural and rural policy data.

[6] Identification of technical assistance needs in agricultural statistics of African countries, Action Plan for Africa of the Global Strategy, GS/AfDB report, February 2015

[7] Examples of these strategies include the Strategic Plans for Agriculture and Rural Statistics which are being designed in the context of the Global Strategy, as well as the generic National Strategies for the Development of Statistics.

3.7 AGRIS will be implemented within the framework of the Global Rural and Agricultural Integrated Surveys (GRAInS) Partnership. GRAInS is a joint initiative of several key international agencies – including FAO and the World Bank – which are involved in the funding or methodological design of agricultural and rural surveys. The longer-term vision is for GRAInS to be formally established as a separate institutional entity and for a common financing instrument (e.g. a multidonor fund) to be created. This will enable the pooling of resources and thus attain a truly joint programme.

3.8 To achieve greater coordination and foster methodological coherence among related survey initiatives, including AGRIS and LSMS-ISA, as well as to promote methodological and technological advances in the collection, dissemination and use of agricultural data, the following are identified as common objectives of the GRAInS Partnership, which should catalyse joint or closely coordinated activities:

- to work towards the methodological and operational integration of the AGRIS and LSMS-ISA programs and to strengthen methodological standards in household and farm surveys in developing countries;
- to enhance the ability of international agencies, in close coordination with regional partners, to provide technical assistance to countries and build capacity in the design and implementation of integrated surveys on agriculture and the rural space;
- to develop and test technological innovations to promote the integration and usability of different data sources and reduce the cost of data collection, while improving quality and timeliness: examples include the enhanced application of sensors, mobile phones, GPS, satellite imagery, and various forms of Big Data, which may complement and add value to more traditional data collection methods such as household and farm surveys.

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UNECE, the Generic Statistical Business Process Model, http://www1.unece.org/stat/platform/display/metis/The+Generic+Statistical+Business+Process+Model

UNSD, Sustainable Development Goal indicators website, http://unstats.un.org/sdgs/