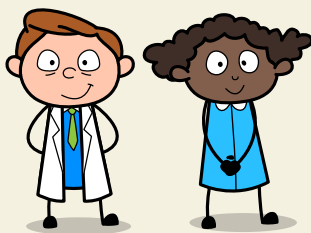




Food and Agriculture
Organization of the
United Nations

GLOSOLAN is a Global Soil Laboratory Network which aims to harmonize soil analysis methods and data so that soil information is comparable and interpretable across laboratories, countries and regions.

Good practices on purchasing and operating laboratory equipment



This document aims to provide laboratory staff and managers with guidance on **what to do** and **what not to do** when purchasing laboratory equipment or receiving it as a donation.

The document is divided into three sections to provide users with as much support as possible. It also includes guidance on good practices in managing consumables and hazardous substances.





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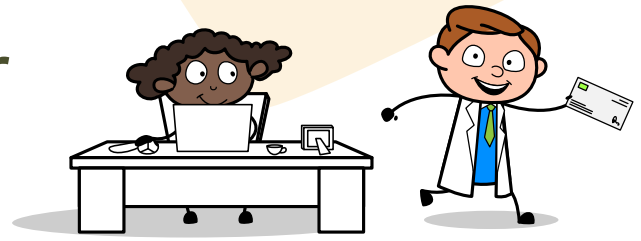
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BEFORE purchasing or accepting a donation



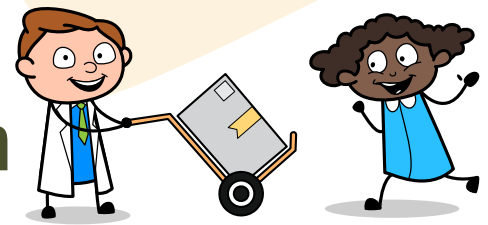
	Good Practice	Bad Practice
Know what you can have	<p>Make a list of providers in your country and region. Do not purchase anything you will not be able to receive technical assistance or get trained on.</p> <p><i>Before placing an order, ask the provider to confirm the maintenance and training services they offer.</i></p>	<p>Purchasing critical equipment without making sure that you will be able to receive timely technical assistance and training on its use.</p> <p><i>Making the wrong decisions will seriously impact your budget and compromise the efficiency of your laboratory.</i></p>
	<p>If you are receiving new equipment through a donation, ask the donor for organizing regular training on its use and maintenance. Select equipment from a company that is able to provide service to your country and region.</p>	<p>Accept donations of equipment that you will not be able to operate adequately. Donors should adapt to your needs keeping into consideration your country and laboratory specific limitations!</p> <p><i>If there are donations of surplus equipment, do not accept if proof cannot be provided of maintenance and working order. Donors ought to provide spare components to ensure onward maintenance – donors should not be dumping equipment.</i></p>
Assess your needs and capacities	<p>Make a business plan. Ask yourself if you really need the specific equipment taking into consideration factors such as the number of samples you analyze annually, operating costs, availability of reagents and consumables, and the minimum level of technical capability of staff.</p> <p><i>Writing down the specifications of the equipment you need based on the analysis you want to carry out will help you identifying the most suitable equipment to purchase or to ask for as a donation.</i></p> <p>Are you able to resource the equipment e.g. staff, consumables, maintenance, training? <i>Allow budget of 1/3 for equipment, 1/3 maintenance/ training and 1/3 consumables over 5 years as a rough guide.</i></p> <p>Do you have an appropriate building for the equipment? Consider the environment e.g. temperature (stable), humidity, dust free, clean water supply, stable electricity supply, gases etc. Can the building be made secure from outside persons and in particular from unauthorized/untrained personnel from your own organization.</p>	

PLACE your order or request for donations



	Good Practice	Bad Practice
Place your request	<p>Limit the risk for something to get wrong! The risk for corruption and fraud can be limited if you get the right documents done. Prepare a Request for Quotation or an Invitation to Tender containing the following information:</p> <ul style="list-style-type: none"> • Details of the buying organization; • Equipment specification for all equipment you intend to buy; • Minimum time for delivery. <i>It is always a good practice to specify the time you wish the delivery to be executed when launching your call for tenders;</i> • Request for all legal documents that prove the capability of the supplier to provide the needed laboratory equipment. <p>If you are applying for a donation, be clear on the equipment you need with the donor. Donors often do not purchase equipment based on brands but on technical specifications.</p>	<p>Submit an incomplete or unclear Request for Quotation or an Invitation to Tender.</p> <p><i>The better you explain yourself, the higher is the possibility to get what you want and really need. Adding details will decrease the risk for you to get cheated by non-qualifying companies and/or get the wrong equipment.</i></p>
Make your decision	<p>Make sure to have a strong and transparent procedure to evaluate the quotations you receive. Supplier should be selected based on a set of objective criteria like:</p> <ul style="list-style-type: none"> • Total cost of the quotation. <i>Saving money is good but very cheap equipment might not last for long;</i> • Quality of the equipment and assistance service; • Time for delivery. <i>Do not purchase something you will not receive in a reasonable time or when needed;</i> • Conditions of the payment. <i>Try not to pay in advance.</i> 	<p>Evaluate the quotations without having clear selection criteria in mind or favoring people you are friend with.</p>
Place the order	<p>Make sure that your administration is trained on how to issue orders and handle payments, which should be executed as per the conditions specified in the tender/quotation.</p>	<p>Place the order and pay the supplier without following any internal procedure and in disagreement with the instructions in the Request for Quotation or Invitation to Tender.</p>

WHEN you receive your purchase or donation



	Good Practice	Bad Practice
Housing of equipment	<p>Make sure that the room housing the equipment is secure and all emergency facilities are working.</p> <p>Different equipment might require the implementation of different emergencies procedures and facilities. All laboratory staffs should be trained to respond to emergency situations!</p>	<p>Install equipment in not secured rooms, exposing it to weather events and temperature stresses.</p> <p><i>The proper installation of laboratory equipment reduces the risk of it breaking down. Thus, it is the first step towards good maintenance.</i></p>
Installation	<p>Ask the provider to install your new equipment. Thereafter, assist to the installation and interview technicians on its functioning and maintenance procedures. If possible, take notes, record technicians' answers and shoot videos, the more you know, the easier it will be to maintain your equipment.</p>	<p>Install the new equipment yourself without being appropriately trained for it.</p> <p><i>Incorrect installation of equipment can result in equipment damage and malfunctioning.</i></p>
Calibration	<p>Ensure that the equipment is calibrated as per the manufacturer's recommendations before using it.</p>	<p>Use your new equipment without making sure that this is calibrated.</p> <p><i>Calibration enhances results and overall instrument performance.</i></p>
Stay in touch	<p>Either before or after receipt of donation, consider joining User Group forums for instrumentation within communities (e.g. plasma spectroscopy – Plasmachem) or associated with manufacturers (e.g. Agilent User Groups) or form your own and link to other academic groups to share experience and lessons learnt.</p>	

AFTER your purchase or acceptance of a donation



	Good Practice	Bad Practice
Use and maintenance of equipment	<p>Read the instruction manual of the new equipment carefully and, if possible, organise training on its use and maintenance.</p> <p>Laboratory staff should receive regular training on how to operate laboratory equipment and perform basic maintenance. If possible, more than one laboratory staff member should be able to operate and perform basic maintenance on the laboratory equipment.</p> <p>Proper regular maintenance of equipment will ensure the equipment's performance to specification and probably extend its life giving good value for money to the laboratory.</p> <p>Practice, practice, practice! Start using the equipment you got trained for as soon as possible. Do not take the risk to forget what you learnt.</p> <p>Develop Standard Operating Procedures to ensure consistency of operation of equipment. This document or collection of documents will facilitate staff succession, assist training, instil discipline and consistency of operation and provide a framework for quality assurance and maintenance.</p> <p>Develop instrument records for operating parameters/routine checks to assist in quality assurance, encourage preventative maintenance and identifying breakdown issues.</p> <p>Develop training records for each member of staff associated with individual items of equipment – define level of competency.</p>	<p>Operate or perform maintenance on new equipment without being trained or have carefully studied its instruction manual.</p> <p>Have only one laboratory staff member trained on the use and basic maintenance of laboratory equipment.</p> <p><i>If the person appointed to the operation and maintenance of the equipment gets sick, transferred, resigns or retires, no one in your laboratory will be able to replace them. Having the knowledge in the hands of one or few people can seriously affect the performance of your laboratory.</i></p> <p><i>Delaying the use of new equipment leads to its underuse.</i></p>
Safety measures	<p>Prepare appropriate Risk Assessments for generic activities (e.g. operation of equipment, handling of acids) and for specific tasks.</p> <p>Wear appropriate personal protective equipment (PPE) including clothes and accessories like gloves and masks to operate laboratory equipment, handle unknown material and manage consumables like chemical reagents.</p>	<p>Operate equipment, handle unknown material or manage consumables like chemical reagents without wearing appropriate PPE.</p> <p><i>PPE are made to protect you from exposure to harmful chemicals, pathogens and dangerous surfaces. Do not put your health at risk!</i></p>

	Good Practice	Bad Practice
Supply of consumables	<p>Do not wait until the very last minute to purchase laboratory consumables and chemicals. Consult your supplier about availability and delivery time and place your order to allow delivery well before you expect to run out of them. In the case of unforeseen emergencies, look for a neighboring laboratory that may be able to provide you with consumables. You may also negotiate with neighboring laboratories to purchase consumables together; placing large orders can result in discounts allowing you to allocate remaining budget to other activities.</p> <p>Consider organizing collectives particularly in terms of maintenance visits, service contracts and Preventative Maintenance (PM) engineer checks.</p> <p>Sign a <i>Rate Contract</i> with consumable suppliers including a note on the delivery time of chemicals and consumables. This will reduce your administrative work and the risk for delays in consumables delivery.</p> <p>Nothing should stop your laboratory from performing at its best!</p>	<p>Expect that consumables are delivered the day after you place your order. Even if your country has a very efficient system of service providers, the unexpected can happen!</p> <p><i>If you are left without consumables, you will not be able to run soil analysis. Besides reducing the efficiency of your laboratory, this can affect the reputation of your laboratory.</i></p>
Waste disposal	<p>Dispose of the waste generated in the performance of laboratory analysis appropriately. The Material Safety Data Sheet (MSDS) will likely give guidance on the proper disposal of laboratory waste depending on its classification as a hazardous or dangerous substance.</p>	<p>Accumulating and storing waste generated by the performance of laboratory analysis in a room that you do not empty on a regular basis.</p> <p><i>If you do not have access to efficient waste collection and disposal services, submit a request to your government or Ministry in charge. Other laboratories will likely experience your same concerns; joining efforts can result in a winning strategy! In case of need, ask for the help of international organizations.</i></p>
Performance of equipment	<p>Check the performance of your equipment on a regular basis and ensuring it is calibrated as per the manufacturer's recommendations.</p>	<p>Think that your equipment will always be performing the same.</p> <p><i>Calibration enhances results and overall instrument performance.</i></p>
Data management	<p>Ensure appropriate data management strategy is in place – data output is likely to increase with modern equipment (e.g. from single element to multi-element analyses). How will data be archived and stored securely?</p>	



The Global Soil Partnership (GSP) is a globally recognized mechanism established in 2012. Our mission is to position soils in the Global Agenda through collective action. Our key objectives are to promote Sustainable Soil Management (SSM) and improve soil governance to guarantee healthy and productive soils, and support the provision of essential ecosystem services towards food security and improved nutrition, climate change adaptation and mitigation, and sustainable development.

GLOSOLAN GLOBAL SOIL LABORATORY NETWORK

GLOSOLAN is a Global Soil Laboratory Network which aims to harmonize soil analysis methods and data so that soil information is comparable and interpretable across laboratories, countries and regions. Established in 2017, it facilitates networking and capacity development through cooperation and information sharing between soil laboratories with different levels of experience. Joining GLOSOLAN is a unique opportunity to invest in quality soil laboratory data for a sustainable and food secure world.

Thanks to the financial support of



For more information

www.fao.org/global-soil-partnership/pillars-action/5-harmonization/glosolan

To join or support the GLOSOLAN network please contact GSP-Secretariat@fao.org

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