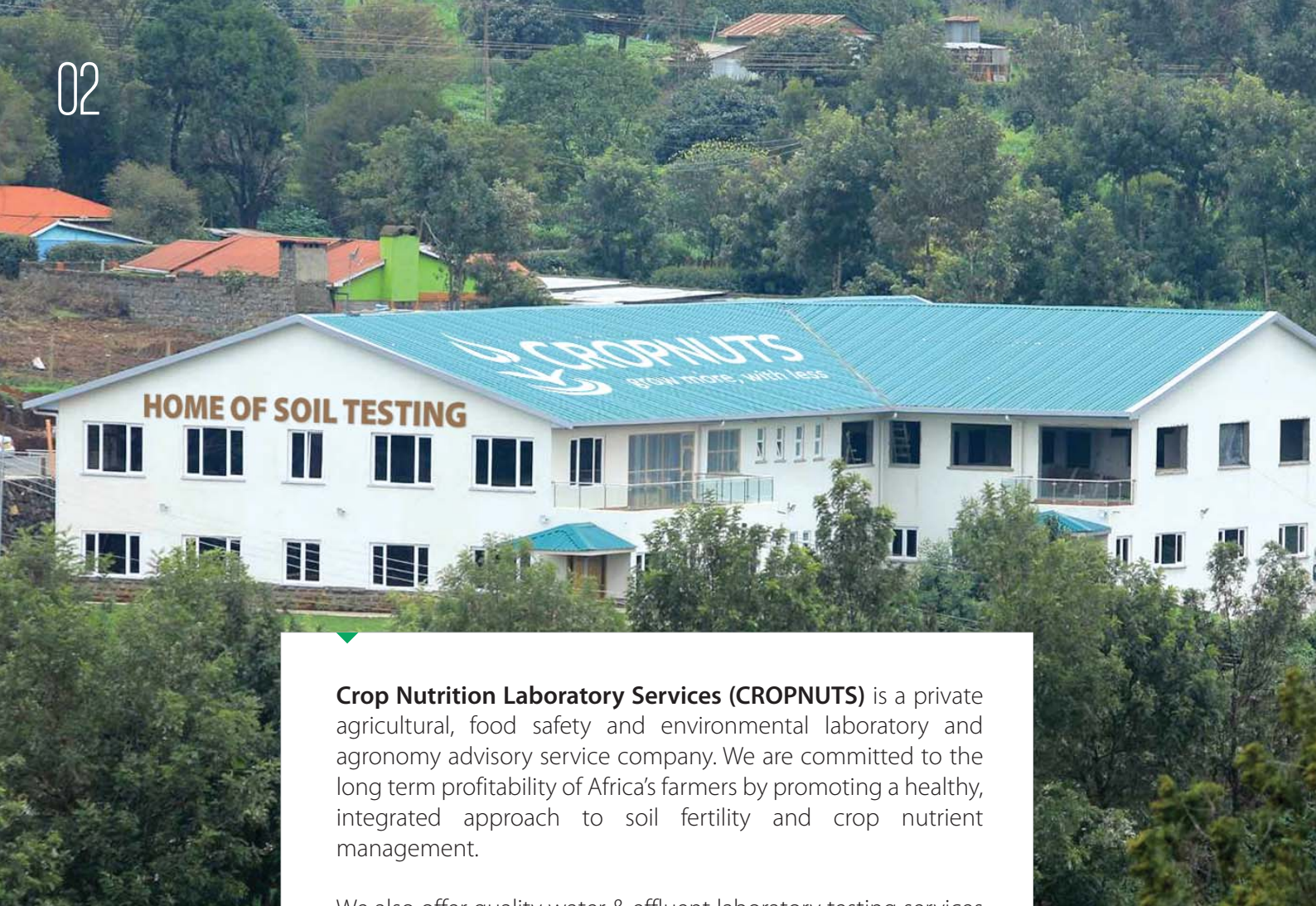




Testing & Advisory Services for **Agriculture**

Laboratory Advisory Agtech





Crop Nutrition Laboratory Services (CROPNUTS) is a private agricultural, food safety and environmental laboratory and agronomy advisory service company. We are committed to the long term profitability of Africa's farmers by promoting a healthy, integrated approach to soil fertility and crop nutrient management.

We also offer quality water & effluent laboratory testing services to stakeholders in the water industry; and Food safety testing and advisory services to stakeholders in the Agri-fresh produce value chain.

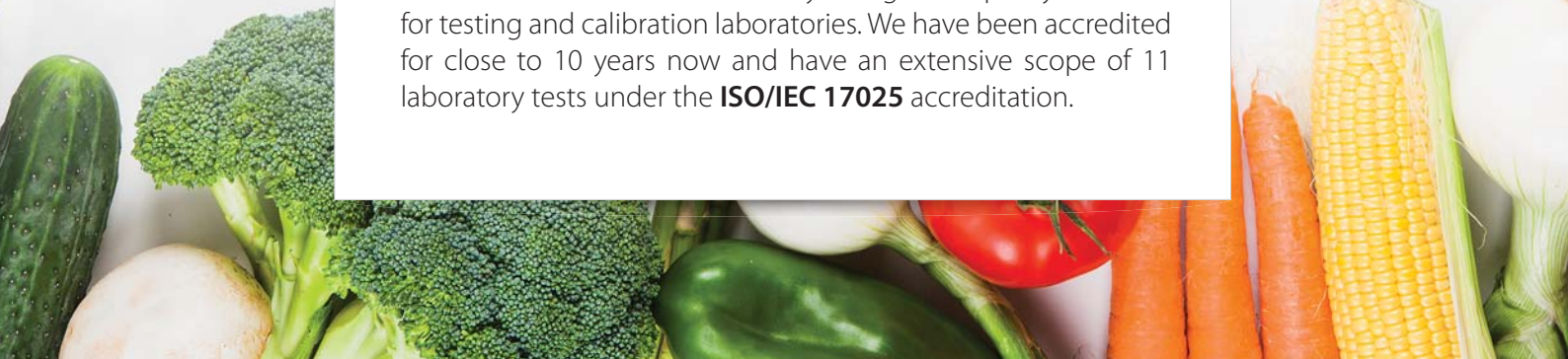


To achieve this, we have established a state-of-the-art **ISO/IEC 17025** accredited Laboratory in Limuru Kenya. Our lab offers affordable analysis of soil, water, hydroponics, NEMA effluent, plant tissue, pesticide residue, heavy metals etc in soils, water, plant and food (fresh produce).

For this, we have an accredited wet chemistry reference laboratory in Limuru Kenya as well as a series of Infrared Spectral laboratories (FarmLabs) across Africa.

Our professional, user friendly lab reports and data-driven recommendations enable you to make the best management decisions for improving your crop yields, crop quality, water quality, food safety and the environment.

CROPNUTS laboratory is **ISO/IEC 17025** accredited. This ISO accreditation is the internationally recognized quality standard for testing and calibration laboratories. We have been accredited for close to 10 years now and have an extensive scope of 11 laboratory tests under the **ISO/IEC 17025** accreditation.



Why Choose Us

- Trusted expertise
- Rapid laboratory turnaround times
- User friendly laboratory reports
- Data-driven recommendations
- Excellent customer support

Our Portfolio of Services for Agriculture:

TESTING SERVICES FOR AGRICULTURE

- Soil Analysis For Greenhouse Crops
- Soil Analysis For Field Crops
- Hydroponics Analysis
- Irrigation Water Analysis
- Leaf Analysis
- Nematode Analysis
- Plant Disease Diagnosis
- Fertilizer & Lime Quality Analysis
- Compost & Manure Analysis
- Animal Feed Analysis

ADVISORY SERVICES FOR AGRICULTURE

- Soil Mapping
- Land Suitability Survey
- Precision Farming
- Agronomy Services
- Irrigation Water Management (Aquacheck)
- Agri-Finance Consulting





Testing Services for Agriculture



Soil Analysis for Fields Crops



Healthy, balanced soil fertility is the basis for high yields crops. Soil testing is the only way to determinate the fertility of our soils. Purchasing of the correct input products, such as lime and fertilizers, is only possible after carrying out soil testing.

We are **specialists in soil fertility management** and developing fertilizer programs for farmers. We carry out **fast and affordable** soils analysis in our laboratory, and we use the results to make the right recommendations for your farm. We are **independent** and don't sell any farm input products - we offer you only the best advice.

Soil testing is essential for building a sustainable soil fertility and fertilizer management program for your farm, to increase your crop yields and reduce your input costs.



The package:

pH, Salinity, Phosphorus, Potassium, Calcium, Magnesium, Sodium, Sulphur, Iron, Manganese, Zinc, Cooper, Boron, Aluminium, Organic matter and Nitrogen.

We deliver a Professional Report with the following features:

1. Fast, accurate results
2. Color coded for quick interpretation
3. Experienced guideline levels based on the crop and soil type
4. History of results on same report - no looking through old files!
5. Comments on deficiency symptoms
6. Full Soil Fertility Correction Recommendations including rates of lime, gypsum, phosphate and compost
7. Crop Specific Fertilizer Program
8. Crop Specific Foliar Feed Program

For a complete service package, we also offer our **SOIL HEALTH CARE PROGRAM**. This includes on-farm sampling, laboratory analysis, full recommendations and specialist farm visits. Please ask for more details on this program.



Soil Analysis for Greenhouse Crops

Greenhouse crops growing in soil require regular water soluble nutrient extraction in order for growers to adjust the A/B tank fertilizer recipe, to **maximize production and quality**.

We provide our customers with fast and accurate local 1:2 soil: Water extract analysis. We provide **high impact fertilizer** recommendations, which are based on more than a decade of local experience.

We offer you first class support with our technical support expert, who will visit your farm on a regular basis to discuss crop nutrition and crop health issues, take samples, conduct sample training sessions to build your on-farm capacity and be available on the phone whenever you have a problem or need a question answered. We value building long term relationships with our customers.

The 1:2 volume Soil: Water extract tells us what is immediately available to your crop but does NOT tell you about the health and fertility of your soil.



To better manage your soils, we recommend our **SOIL HEALTH CARE PROGRAM** which looks at the balance of total nutrients levels in the soil and the humus content. It is very important to keep greenhouse soils properly balanced, to assist in reducing fertilizer costs and to minimize root diseases. Our program gives you recommendations of applications of gypsum for sodium and salt control, lime to supply calcium and correct acidity, rock phosphate and compost requirements to further condition the soil and maintain a **healthy, biologically active rooting environment**.

FEATURES OF OUR LAB REPORTS:

1. Fast, accurate results
2. Results in ppm or mmol/l
3. Internationally accepted guide levels adjusted to suit local conditions
4. Color coded for quick interpretation
5. Historical results for last 4 analysis
6. High impact Corrective Fertilizer Program based on results
7. Standard program for the crop
8. Foliar feeding program for the crop
9. Recommendations in g/m³ or Kg per tank



Hydroponics Analysis



We offer fast and cost effective analysis of hydroponic samples. With over 10 years experience working with growers in East Africa, we understand local growing conditions and formulate **high impact fertigation programs** which produce fantastic quality, high production per square metre and programs which are focused on reducing pest and disease outbreaks.

Our strict internal quality control procedures mean we produce **accurate analytical results** which you can rely on to make the right decisions.

We offer you **first class support** with our technical support expert, who will visit your farm on a regular basis to discuss crop nutrition and crop health issues, take samples, conduct sample training sessions to build your on-farm capacity and be available on the phone whenever you have a problem or need a question answered. We value building long term relationships with our customers.

HYDROPONICS ANALYSIS:

Samples: Drip, drain and substrate samples

Analysis: pH, EC, NO₃, NH₄, Cl, HCO₃, Si, P, K, Ca, Mg, Na, Cu, Fe, Zn, Mn, Mo, B

FEATURES AND BENEFITS:

1. Fast, accurate results
2. Results in ppm or mmol/l
3. Internationally accepted guide levels adjusted to suit local conditions
4. Color coded for quick interpretation
5. Historical results for last 4 analysis
6. High impact Corrective Fertilizer Program based on results
7. Standard program for the crop
9. Recommendations in g/m³ or Kg per tank

RELATED SERVICES: 1:2 Volume Extract Soil Analysis, Nematode Analysis, Plant Pathology Analysis, Irrigation and Drinking Water Analysis, NEMA Effluent Water Analysis.





Irrigation Water Analysis

High sodium, salinity, bicarbonates in water are all big problems when irrigating crops. Knowing the chemistry of the water is essential part of **good irrigation management**.

The sodium adsorption ratio (SAR) is a critical calculation for assessing the suitability of irrigation water and is based on relationship between sodium, calcium and magnesium in your water. Water with a high SAR can quickly degrade soil structure - but this can be avoided, with the use of gypsum, for example.

Our irrigation water testing analysis is quick and covers all the important chemistry required for us to give you the **best recommendations**. We carry out **charge balance** calculations on all our water samples to ensure analytical accuracy.

The most important chemistry parameters required for managing irrigation water includes:

- pH
- Salinity and total salts
- Sodium
- SAR - Sodium Adsorption Ratio
- Residual Sodium Carbonate

The package:

pH, EC, Nitrate, Ammonium, Phosphorus, Potassium, Calcium, Magnesium, Sodium, Chloride, Sulphate, Copper, Iron, Zinc, Manganese, Boron, Bicarbonates and SAR.

Physical analysis: Turbidity, Colour and Total Suspended Solids.

Reverse Osmosis Water Analysis:

Treatment of saline irrigation water requires Reverse Osmosis technology to remove salts. Due to the effects of the water chemistry on the reverse osmosis membranes, a specific water analysis is required to optimize the design and maintenance.

The package:

pH, EC, Nitrate, Ammonium, Phosphorus, Potassium, Calcium, Magnesium, Sodium, Chloride, Sulphate, Copper, Iron, Zinc, Manganese, Boron, Bicarbonates, Aluminium, Silicon, Fluoride, Strontium, Barium, Total Dissolved Solids and Total Suspended Solids.



Leaf Analysis



Leaf analysis is an excellent **management tool** for fine tuning your crop nutrition program. Each nutrient that we test for has a specific function in the crop circle, and is **essential for high yields**. The use of leaf analysis in combination with soil testing gives us a very clear picture of the whole nutrition system.

The laboratory results for each nutrient are compared against well known "optimum guide levels" for each crop type. This means we can quickly diagnose which nutrients are limiting your yields and make **scientific recommendations** on how to correct the problem.

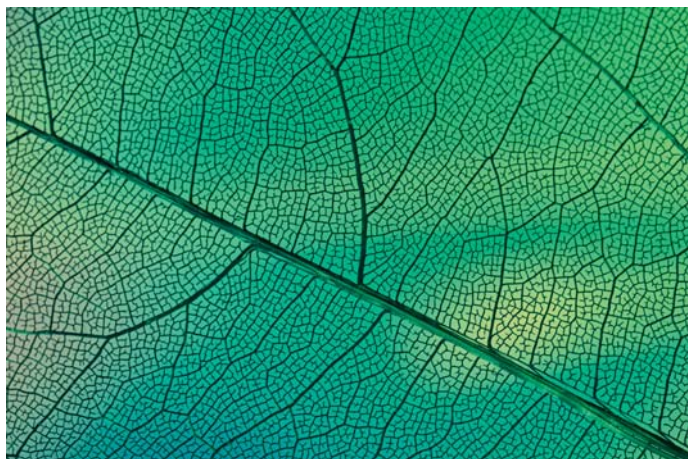
- Diagnose problems quickly
- Monitor crop nutrition status
- Manage nutrients ratios to avoid disease
- Build a micronutrient foliar feed program
- Guarantee crop response to inputs
- Increase yields and profits

Sample type:

Leaf and Plant Tissue

Package:

N, P, K, Ca, Mg, Na, Fe, Mn, Zn, Cu and B





Nematode Analysis

Nematodes cause significant damage to many crops by feeding on plant roots, causing symptoms that are comparable to nutrient or water deficiency including yield loss, stunting, yellowing, wilting, symptoms of nutrient deficiency, and malformations of the root which are rarely attributed to nematodes.

We support farms with laboratory based **nematode count and identification**, carried out by our **internationally qualified nematologist**. We process the results in user friendly reports, with appropriate **environmentally responsible recommendations**.

Nematode Management Services

In response to farm demand we have also established our **Nematode Management Service**, which is a pro-active approach to nematode control:

- Farm visits
- Visual assessment of nematode damage
- Design of a carefully targeted sampling program
- Laboratory nematode identification and count
- Development of a sustainable nematode control program based on cropping system, irrigation system and the lab results

We are experienced in developing **Nematode Management Program that work**.

Control options are tailor-made to the nematode species, crop type, location and economic return. This includes using biological strategies, botanical nematicides, biofumigation in the form of **Integrated Pest management (IPM)**, in combination with applications of well made compost and good crop rotation practices.

We have worked successfully with many growers to reduce their nematode problems, which **significantly increases yields**.





Plant Disease Diagnostics



We carry out **affordable** plant disease diagnostics for commercial growers and small holder farmers. rapid and accurate diagnosis of disease is always necessary before proper control measures can be implemented. Practical and **experienced recommendations** are given with each report.

These services include investigations of plants, leaves, roots, soils and substrates for routine crop disease diagnosis, including common fungi and bacteria, such as leaf spots, root rot diseases, cankers, wilt diseases and nematodes.

Our services give you the information you need to make the **right decisions**, ensuring you apply the correct product, quickly and effectively. Our services **save you money**.





Fertilizer & Lime Quality Analysis

With lime, fertilizer and foliar feed products coming from many different sources and many different countries it is useful to guarantee quality through analysis. We use our own laboratory for fertilizer and lime nutrient analysis.



The Package:

ANALYSIS FOR FIELD GRADE FERTILIZERS:

- NPK Compound
- Urea
- Calcium Ammonium Nitrate (CAN)
- DAP
- Ammonium Sulphate
- MOP
- Triple Super Phosphate (TSP)

ANALYSIS FOR SOIL CORRECTION INPUTS

- Rock Phosphate
- Gypsum
- Lime

ANALYSIS FOR WATER SOLUBLE FERTILIZERS

- MKP (Mono Potassium Phosphate)
- Magnesium Sulphate
- Potassium Nitrate
- Potassium Sulphate
- Magnesium Nitrate
- Manganese Sulphate
- Zinc Sulphate
- Borax
- Calcium Nitrate



Compost & Manure Analysis

Compost

We strongly recommend applications of quality compost to soils for long term sustainability and suppression of soil borne diseases and pests. Compost has a big advantage over manure in that as well as nutrients, it also supplies a huge microbial load to the soils and is an excellent soil bio-activator and disease suppressor. However, compost quality is the key to seeing great results and poorly made compost can cause more harm than good – ensure you manage the C:N ratio, moisture and temperature in your compost carefully.

If natural compost processes are not working properly there may be a problem with E.coli and Salmonella pathogens in the compost which can be a very big issue for edible horticultural crops – we offer a test for these so you can be sure that your compost is pathogen free before application.

We also offer compost liquid extract analysis to look at the pH, EC and levels of available nutrients.



Manure

Manure is a good choice for adding carbon and nutrients (P and K especially) to sandy and low carbon / compacted soils. However, adding manure to soils that are not suited to the mineral content of the manure can cause serious problems with soil fertility and future crop production.

The main problems are excess potassium and phosphorous in the manure which build up in the soil locking up micronutrients like zinc, iron and manganese and reducing the uptake of magnesium and boron. Manure also pushes calcium out of the soil, further disrupting the mineral balance – it can therefore be useful in high calcium soils which are prone to micronutrient deficiencies.

Manure does not add biology to your soils. Manure only supplies carbon which is a slowly available food source for the microbes. Compost adds the biology! Therefore before applying manure, always consider carefully the fertility and nutrient balance of your soils in combination with the analysis of manure type you have access to.

The Package:

% Dry Matter, % C, % N (C:N ratio), P, K, Ca, Mg, Na, S, Cu, Fe, Mn, Zn, Mo, B



Animal Feed Analysis

High quality livestock feed is essential for productive livestock, whether you raise them for milking, laying or slaughter. We use a combination of infrared technology and wet chemistry to analyze livestock feed nutrient content.

This includes the protein, energy and mineral content of fodder and feed ingredients. Additional tests over and above feed nutrient analysis includes test for mycotoxins and heavy metals in animal feed, and mineral lick analysis. We also offer recommendations on what additives will provide your animals a healthy, well balanced diet.

We work with livestock farmers and animal feed suppliers who are looking to formulate the best possible livestock feed.



ANIMAL FEED ANALYSIS PACKAGE:

Energy, B, Mo, Fe, Cu, Co, Mn, Na, Su, Mg, K, P, Ca, Fibre, Sugar, Digestibility, Oil, Protein, Starch, Ash & Dry Matter

MINERAL LICK ANALYSIS PACKAGE:

Sodium Chloride (NaCl), Ca, Mg, P, Mn, Fe, Zn, Cu, Mo, Co, Se



Advisory Services for Agriculture





Advisory Services for Agriculture



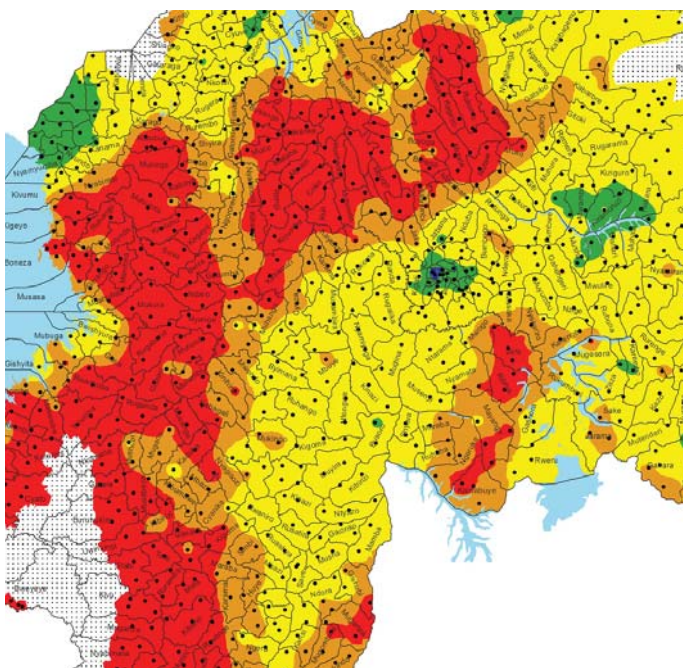
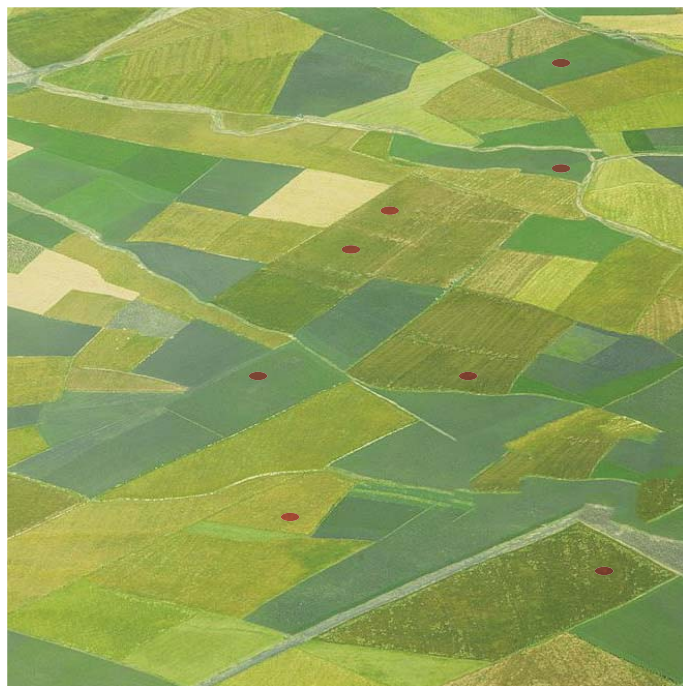
Soil Mapping

We offer regional and national soil mapping surveys with latest GIS technology to provide vital soil fertility information to policy makers, Agricultural project managers, and fertilizer industry stakeholders.

Benefits:

Our soil maps can be used for a wide variety of different purposes. These include:

- Developing variable rate fertilizer recommendations.
- Producing baseline soil fertility maps at farm and field scale, and analyzing how they change over time due to management interventions.
- Developing regional soil maps.
- Generating fertilizer recommendations for specific crops at multiple different scales.



Land Suitability Survey

A land suitability survey is a soil evaluation or assessment used to determine the fitness of a given parcel of land to grow specific agricultural crops.

Our land suitability surveys are designed to help you identify the crops and farming systems that are best suited to your land. Alongside assessing the chemical fertility of the soils, we provide you with detailed information about the soil's physical properties such as drainage, rooting depth and water holding capacity, crucial in assessing the long term economic sustainability of any agricultural activity.

Through a combination of grid sampling, a semi-detailed soil classification and soil profiling we provide this essential information to give you a powerful decision support system to guide your investments fruitfully.

We have conducted land suitability assessment & classification over tens of thousands of hectares of land and successfully guided a wide variety of investments with these methods.

Benefits:

- Top and subsoil fertility maps addressing the chemical fertility of the land down to 50 cm, identifying issues and providing recommendations on how to correct them.
- Maps of topography, soil drainage, soil depth available for root growth and soil water holding capacity down to 100 cm.
- Map of soil suitability and advisory on:
 - Crop potential map identifying areas with the best ROI,
 - Optimal farming systems with suggestions on crop rotations,
 - Most suited irrigation systems; ideal locations for centre pivot placement.





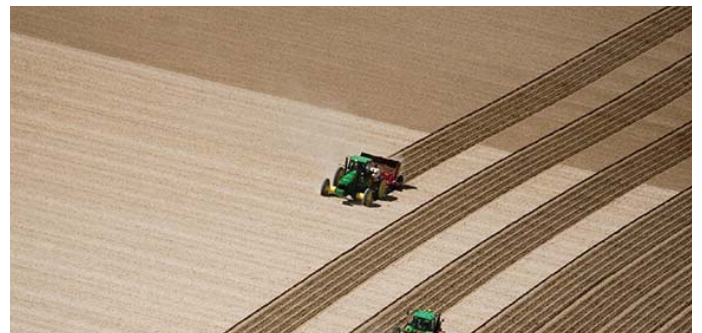
Precision Farming

Precision farming, Precision agriculture, satellite farming or site specific crop management (SSCM) is a farming management concept based on observing, measuring and responding to inter and intra-field variability in crops.

The goal of precision farming is to define a decision support system (DSS) for whole farm management with the goal of optimizing returns on inputs while preserving resources.

Our precision farming services combines soil mapping with satellite imagery (satellite farming) to determine the level of variation in soil properties across each one of your fields. We use this information to identify different management zones within each field, and then provide you with recommendations to help you reach maximum potential in each zones.

By combining our agronomy experience with crop trials data and the latest precision agriculture techniques, we can help you to push down farming costs and drive up farm profits.



Benefits:

- Satellite crop monitoring system. Monitor crop performance across your fields using satellite imagery.
- Agricultural mapping. Create management zones based on multi-year crop health trends and soil type mapping.
- Variable rate application. Create variable rate prescription maps lime and fertilizer applications.
- Select crop varieties and seed rates based on soil potential.
- GIS, GPS and remote sensing for crop management. Identify areas that are under-performing and use our laboratory services to identify nutrient deficiencies and/or disease threats.
- Advise on GPS and variable rate equipment set up (seeders/spreaders)



Agronomy Services

Large and medium scale arable farmers in Africa can now access our world class, independent agronomy services - a fully integrated advisory service incorporating all aspects of profitable crop production. Being fully independent we do not sell any farm inputs, but offer growers sound advice, based on international experience and the latest knowledge and technologies from around the world.

We specialize in maize, wheat, barley, canola, peas, legumes and potatoes.



The service includes:

POST HARVEST

- Soil sampling
- Wet chemistry complete soil analysis
- Lime recommendations
- Farm specific fertilizer blend formulation
- Tillage strategies
- Pre-season crop planning/ crop rotation advice
- Fallow weed control program
- Recommended crop trials (separate service)

PRE SEEDING VISIT

- Advice on seed rates, planting depth and planter set up
- Seed treatment recommendations

IN CROP VISITS

(Every 2 weeks/minimum 8 visits per crop)

- Assess crop emergence
- Post emergent weed control program .
- Continual assessment of disease /pest/nutrition status
- Nitrogen and sulphur topdressing program
- Targeted spray programs
- Leaf analysis and foliar feeding program
- In crop management strategies



Soil Moisture Management

We offer irrigation scheduling services through the use of Internet of Things (IoT) in conjunction with soil moisture sensors allowing growers to optimize irrigation and increase water use efficiency on the farm. Sensors provide an underground eye that continuously monitors the soil's moisture status in the rooting zone and beyond, all within reach of a click of a mouse or a tap of a screen. Growers can quickly get insight on:

- Current soil moisture status
- Depth of irrigations
- Daily water consumption rates
- Date/Time of irrigation events
- Irrigation recommendations



Improved irrigation scheduling will bring about the following benefits reducing the environmental impact of farms:

- Up to 30% less water use
- 15-20% savings in fertilizer use
- Improved root health
- Up to 50% reduction in crop disease
- Improved root respiration
- Increased yields
- Prolongation of shelf life of produce





Agri-Finance Consulting

AGRI FRONTIER

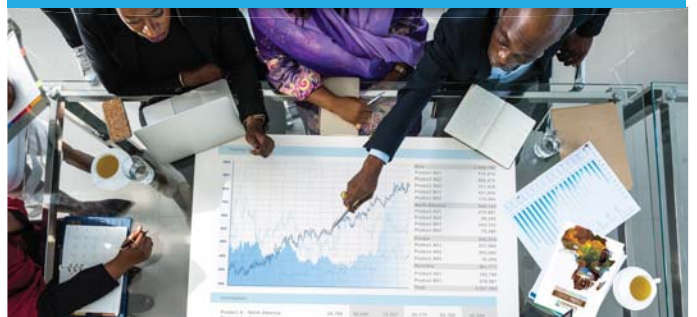
Our partnership with **Agri Frontier** provides you with deep agri-finance consulting expertise. Agri Frontier's consultancy services include business strategy and development, as well as finance and investment.

We have created a package that suits both agri-businesses and investors. **Agri Frontier's** consultancy is specialised in terms of sector and geography, adding value from the field to the boardroom. Their clients range from family owned business to large corporate farms as well as impact, development and private equity investors.



Benefits:

- Working with businesses to become "investment ready" and raise finance.
- Identifying investment opportunities in the agricultural sector for a variety of clients.
- Merger and acquisition services, including commercial due diligence and post-acquisition support.
- Developing business and strategy plans.
- Carrying out Feasibility studies.



Laboratory
Advisory
Agtech



Get in touch with us and we will put you in contact with the local agronomy adviser in your area

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