Seminar organized by INTA's Institutional Relations and Technological Linkage Managements, together with the Argentine Chancellery and Argentine embassies in Africa.

Online economic calculator for crop treatments applications.
- Africa version -

Pablo Abbate (INTA Balcarce)
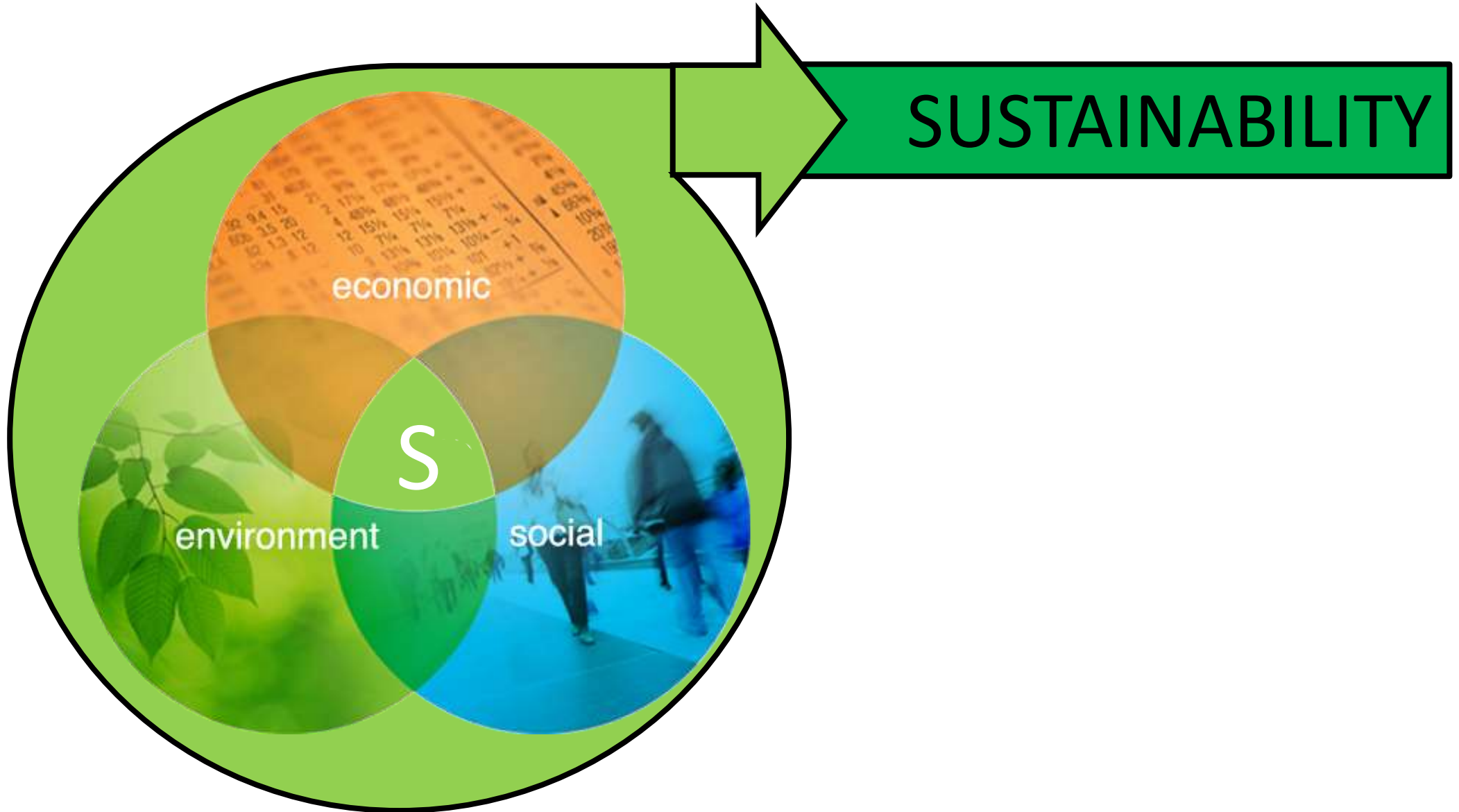**Juan Edwards Molina (INTA Balcarce)**
Nicolás Bronzovich (AAPRESID)

14-sep-2022, Webinar

Good Agronomic Practices

No tillage, covered soil

Crop rotation, active ingredients, genes

Balanced crop and soil nutrition

Integrated management of pests, diseases and weeds

Efficient and responsible use of phytosanitary products

Good livestock practices

Background

- AAPRESID is an argentinian farmers organization that has been formaly developing work in different African countries since 2017.

- INTA is an Argentinian governmental institution with a long history in agronomical technologies research and extension.

- Both organizations have a long story of cooperation.

- INTA and AAPRESID signed a Specific Cooperation Agreement (2019, under renewal) for the Project "Design, implementation and Technology Development for Conservation Agriculture in Ghana and Guinea", with the participation of Pablo Abbate, to provide technical/scientific advice.

- In 2018 Abbate and others began to develop an interactive website to disseminate agronomic information in Argentina. Today there are more than 15 interactive pages, with free and open access, in which 18 authors from more than 10 national and foreign, public and private institutions have participated:

https://cultivaresargentinos.com

The proposed website

https://cultivaresargentinos.com/africa/

What does the website do?

- The website objective is to calculate the total cost of a wide range of agricultural treatments in a wide variety of crops.

- Treatments examples: fertilizer application, growth regulators and stimulants, phytosanitary treatments to protect crop from weeds competition, or the losses due to disease or insect infestations (such as Spodoptera spp, the fall armyworm).

- Crop examples: grain (maize, etc.), industrial (cotton, etc.), forage (sorghum, etc.).

- The website allows to evaluate treatments with up to 4 product applications.

Who is the page for?

- **Agronomy or economics professionals: Independent or from public or private scientific/technological development organizations.**

- **University level ag-oriented students.**

- **Farmers with training in agronomy or economics.**

What does the website do?

- **Data entry section:**

GENERAL DATA

Product price ($/t): expected sale price of the harvested product (grain or any other plant organ), applying the treatment being evaluated, without discounting variable expenses (expenses that vary with the yield obtained); expressed in the chosen monetary unit per ton of product.

`220`

Variable expenses (%): expenses that vary when the yield obtained varies, including the expenses of harvesting (e.g. purchase of bags), drying of the product, transporting the product, marketing, etc.; expressed as a percentage of the product price.

`10`

Expected yield (kg/ha): expected yield applying the treatment being evaluated; expressed in kilograms of product per hectare.

`3000`

DATA OF APPLICATION

Cost of the applied product ($/ha): cost of the product to be applied, including adjuvants, but excluding application expenses; expressed in the monetary unit chosen per hectare.

1st application: `20`

2nd application: `15`

3rd application: `15`

4th application: `15`

Application cost ($/ha): cost of the application without including the product, if the application causes damage to the crop (e.g. by stepping on plants) enter the loss in the cells below; expressed in the monetary unit chosen per hectare.

1st application: `10`

2nd application: `10`

3rd application: `10`

4th application: `10`

Yield losses due to crop damage when applying is done (%): percentage losses due to trampling or breaking of plants. For aerial applications enter 0%. When the application damages the crop due to breakage or trampling of plants, enter the expected percentage loss; keep in mind that when the application generates damage. The damage is usually greater in the first application than in the following ones.

1st application: `3`

2nd application: `1`

3rd application: `1`

4th application: `1`

What does the website do?

- **Results section (output):**

RESULTS

Net price of the product ($/t): price of the product discounting the variable expenses; expressed in the monetary unit chosen when entering the data, per ton of product.
198

Yield losses due to damage to the crop when applying is done (kg/ha): yield losses considering the successive damage of the applications due to breaking or trampling of plants; expressed in kilograms of product per unit area chosen when entering the data.

1st application: 90
2nd application: 29
3rd application: 29
4th application: 29

Treatment cost ($/ha): cost of the treatment considering the variable expenses, cost of the applied products, application cost and yield losses due to application damage; expressed in the monetary unit chosen per hectare.

1st application: 48
2nd application: 31
3rd application: 31
3rd application: 31
Total cost: 140

Treatment cost (kg/ha): cost of the treatment considering the variable expenses, the cost of the applied products, the application cost and the yield losses due to application damage; expressed in kilograms of product per hectare.

1st application: 242
2nd application: 155
3rd application: 155
4th application: 155
Total cost: 707

If the calculated total cost (expressed in $/ha, kg/ha or in the units chosen when entering the data) exceeds the expected increase in income (expressed in the same units as the total cost), the treatment is not economically convenient.

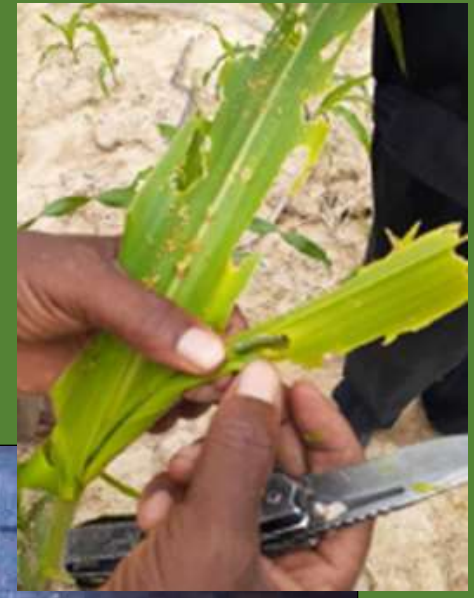# Website use examples

https://cultivaresargentinos.com/africa/

Fall Army Worm control examples

- **Spodoptera is a moth that causes serious damage to maize and other crops.**

Maize Yield Estimation

Spodoptera sp damages

Soybean Yield Estimation

Example 1: treatment cost calculation for Spodoptera control with 1 application

1) Data entry: GENERAL DATA

[Precio del producto] [Prix du produit] [Preço do produto]

400

Product Price ($/t): expected sale price of the harvested product (grain or any other plant organ), applying the treatment being evaluated, without discounting variable expenses (expenses that vary with the yield obtained); expressed in the chosen monetary unit per ton of product.

[Gastos variables] [Dépenses variables] [Gastos variáveis]

35

Variable Expenses (%): expenses that vary when the yield obtained varies, including the expenses of harvesting (e.g. purchase of bags), drying of the product, transporting the product, marketing, etc.; expressed as a percentage of the product price.

[Rendimiento esperado] [Rendement attendu] [Rendimento esperado]

3500

Expected yield (kg/ha): expected yield applying the treatment being evaluated; expressed in kilograms of product per hectare (or any area unit).

2) Data entry: APPLICATIONS DATA

[DATOS DE LAS APLICACIONES] [DONNEES D'APPLICATION] [DADOS DAS APLICAÇÕES]

DATA OF APPLICATION

[Costo del producto aplicado] [Coût du produit appliqué] [Custo do produto aplicado]

Cost of the applied product ($/ha): cost of the product to be applied, including adjuvants, but excluding application expenses; expressed in the monetary unit chosen per area unit (hectare)

[1°-4° aplicación] [1ère-4ème application] [1ª- 4ª aplicação]

1st application: 17.5

2nd application: 0

3rd application: 0

4th application: 0

Example 1: treatment cost calculation for Spodoptera control with 1 application

3) Data entry: APPLICATIONS DATA

[DATOS DE LAS APLICACIONES] [DONNEES D'APPLICATION] [DADOS DAS APLICAÇÕES]

[Costo de la aplicación] [Coût d'application] [Custo da aplicação]

Application cost ($/ha): cost of the application without including the product, if the application causes damage to the crop (e.g. by stepping on plants) enter the loss in the cells below; expressed in the monetary unit chosen per hectare.
.

[1°-4° aplicación] [1ère-4ème application] [1ª- 4ª aplicação]

1st application: 10.0

2nd application: 0

3rd application: 0

4th application: 0

4) Data entry: APPLICATIONS DATA

[DATOS DE LAS APLICACIONES] [DONNEES D'APPLICATION] [DADOS DAS APLICAÇÕES]

[Pérdidas de rendimiento por daño del cultivo al realizar la aplicación]

[Pertes de rendement dues à des dommages aux cultures lors de l'application]

[Perdas de rendimento devido a danos na cultura na aplicação]

Yield losses due to crop damage when applying is done (%): percentage losses due to trampling or breaking of plants. For aerial applications enter 0%. When the application damages the crop due to breakage or trampling of plants, enter the expected percentage loss; keep in mind that when the application generates damage. The damage is usually greater in the first application than in the following ones.

[1°-4° aplicación] [1ère-4ème application] [1ª- 4ª aplicação]

1st application: 1.5

2nd application: 0

3rd application: 0

4th application: 0

5) Data entry: CALCULATE

[Calcular] [Calculer] [Calcular]

Press Calculate to update the results

Calculate

[Presionar Calcular para actualizar los resultados]
[Appuyez sur Calculer pour mettre à jour les résultats]
[Pressione Calcular para atualizar os resultados]

6) Results: ← [Resultados] [Résultats] [Resultados]

[Precio neto del producto] [Prix net du produit] [Preço líquido do produto]

260

Net price of the product ($/t): price of the product discounting the variable expenses; expressed in the monetary unit chosen when entering the data, per ton of product.

7) Results: ← [Resultados] [Résultats] [Resultados]

[Pérdidas de rendimiento por daño al cultivo al realizar la aplicación]
[Pertes de rendement dues aux dommages à la culture lors de l'application]
[Perdas de rendimento por danos à cultura no momento da aplicação]

Yield losses due to crop damage when applying is done (kg/ha): yield losses considering the successive damage of the applications due to breaking or trampling of plants; expressed in kilograms of product per unit area chosen when entering the data.

[1°-4° aplicación] [1ère-4ème application] [1ª- 4ª aplicação]

1st application: | 53

2nd application: | 0

3rd application: | 0

4th application: | 0

8) Results:

[Resultados] [Résultats] [Resultados]

[Costo del tratamiento] [Coût de traitement] [Custo do tratamento]

Treatment Cost ($/ha): cost of the treatment considering the variable expenses, cost of the applied products, application cost and yield losses due to application damage; expressed in the monetary unit chosen per hectare.

[1°-4° aplicación] [1ère-4ème application] [1ª- 4ª aplicação]

1st application: 41

2nd application: 0

3rd application: 0

4th application: 0

Total Cost: 41

[Costo total] [Coût total] [Custo total]

9) Results: ← [Resultados] [Résultats] [Resultados]

[Costo del tratamiento] [Coût de traitement] [Custo do tratamento]

Treatment Cost (kg/ha): cost of the treatment considering the variable expenses, the cost of the applied products, the application cost and the yield losses due to application damage; expressed in kilograms of product per hectare.

[1°-4° aplicación] [1ère-4ème application] [1ª- 4ª aplicação]

1st application: 158

2nd application: 0

3rd application: 0

4th application: 0

Total Cost: 158

[Total cost] [Coût total] [Custo total]

Example 1: treatment cost calculation for Spodoptera control with 1 application

10) Results: [Resultados] [Résultats] [Resultados]

[Costo total] [Coût total] [Custo total]

Total Cost ($/ha): 41

Total Cost (kg/ha): 158

If the calculated total cost (expressed in $/ha, kg/ha or in the units chosen when entering the data) exceeds the expected increase in income (expressed in the same units as the total cost), the treatment is not economically convenient.

[Si el costo total calculado (expresado en $/ha, kg/ha ó en las unidades elegidas al introducir los datos) supera el aumento de ingreso esperado (expresado en las mismas unidades que el costo total), el tratamiento no es económicamente conveniente.]

[Si le coût total calculé (exprimé en $/ha, kg/ha ou dans les unités choisies lors de la saisie des données) dépasse l'augmentation attendue du revenu (exprimée dans les mêmes unités que le coût total), le traitement n'est pas économiquement avantageux.]

[Se o custo total calculado (expresso em $/ha, kg/ha ou nas unidades escolhidas ao inserir os dados) exceder o aumento esperado da renda (expresso nas mesmas unidades do custo total), o tratamento não é economicamente viável.]

About the same insect, we ask:

What would the cost of FAW control be, if 2 applications of 2 different phytosanitary were needed?

Example 2: treatment cost calculation for Spodoptera control with 2 applications

1) Data entry: GENERAL DATA

[Precio del producto] [Prix du produit] [Preço do produto]

400

Product Price ($/t): expected sale price of the harvested product (grain or any other plant organ), applying the treatment being evaluated, without discounting variable expenses (expenses that vary with the yield obtained); expressed in the chosen monetary unit per ton of product.

[Gastos variables] [Dépenses variables] [Gastos variáveis]

35

Variable Expenses (%): expenses that vary when the yield obtained varies, including the expenses of harvesting (e.g. purchase of bags), drying of the product, transporting the product, marketing, etc.; expressed as a percentage of the product price.

[Rendimiento esperado] [Rendement attendu] [Rendimento esperado]

3500

Expected yield (kg/ha): expected yield applying the treatment being evaluated; expressed in kilograms of product per hectare (or any area unit).

Example 2: treatment cost calculation for Spodoptera control with 2 applications

2) Data entry: APPLICATIONS DATA

[DATOS DE LAS APLICACIONES] [DONNEES D'APPLICATION] [DADOS DAS APLICAÇÕES]

DATA OF APPLICATION

[Costo del producto aplicado] [Coût du produit appliqué] [Custo do produto aplicado]

Cost of the applied product ($/ha): cost of the product to be applied, including adjuvants, but excluding application expenses; expressed in the monetary unit chosen per area unit (hectare)

[1°-4° aplicación] [1ère-4ème application] [1ª- 4ª aplicação]

1st application: 17.5

2nd application: 5

3rd application: 0

4th application: 0

3) Data entry: APPLICATIONS DATA

[DATOS DE LAS APLICACIONES] [DONNEES D'APPLICATION] [DADOS DAS APLICAÇÕES]

[Costo de la aplicación] [Coût d'application] [Custo da aplicação]

Application cost ($/ha): cost of the application without including the product, if the application causes damage to the crop (e.g. by stepping on plants) enter the loss in the cells below; expressed in the monetary unit chosen per hectare.

.

[1°-4° aplicación] [1ère-4ème application] [1ª- 4ª aplicação]

1st application: 10.0

2nd application: 10.0

3rd application: 0

4th application: 0

4) Data entry: APPLICATIONS DATA

[DATOS DE LAS APLICACIONES] [DONNEES D'APPLICATION] [DADOS DAS APLICAÇÕES]

[Pérdidas de rendimiento por daño del cultivo al realizar la aplicación]
[Pertes de rendement dues à des dommages aux cultures lors de l'application]
[Perdas de rendimento devido a danos na cultura na aplicação]

Yield losses due to crop damage when applying is done (%): percentage losses due to trampling or breaking of plants. For aerial applications enter 0%. When the application damages the crop due to breakage or trampling of plants, enter the expected percentage loss; keep in mind that when the application generates damage. The damage is usually greater in the first application than in the following ones.

[1°-4° aplicación] [1ère-4ème application] [1ª- 4ª aplicação]

1st application: `1.5`

2nd application: `0.5`

3rd application: `0`

4th application: `0`

3) Results with two treatments:

RESULTS

Net price of the product ($/t): price of the product discounting the variable expenses; expressed in the monetary unit chosen when entering the data, per ton of product.

260

Yield losses due to damage to the crop when applying is done (kg/ha): yield losses considering the successive damage of the applications due to breaking or trampling of plants; expressed in kilograms of product per unit area chosen when entering the data.

1st application: 53

2nd application: 17

3rd application: 0

4th application: 0

3) Results with two treatments:

Treatment cost ($/ha): cost of the treatment considering the variable expenses, cost of the applied products, application cost and yield losses due to application damage; expressed in the monetary unit chosen per hectare.
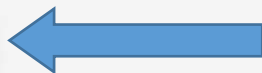
1st application: 41

2nd application: 19

3rd application: 0

3rd application: 0

Total cost: 61

Treatment cost (kg/ha): cost of the treatment considering the variable expenses, the cost of the applied products, the application cost and the yield losses due to application damage; expressed in kilograms of product per hectare.
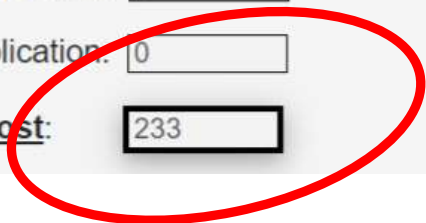
1st application: 158

2nd application: 75

3rd application: 0

4th application: 0

Total cost: 233

Example 2: treatment cost calculation for Spodoptera control with 2 applications

10) Resultados:

[Resultados] [Résultats] [Resultados]

[Costo total] [Coût total] [Custo total]

Costo total ($/ha): **61**

Costo total (kg/ha): **233**

If the calculated total cost (expressed in $/ha, kg/ha or in the units chosen when entering the data) exceeds the expected increase in income (expressed in the same units as the total cost), the treatment is not economically convenient.

[Si el costo total calculado (expresado en $/ha, kg/ha ó en las unidades elegidas al introducir los datos) supera el aumento de ingreso esperado (expresado en las mismas unidades que el costo total), el tratamiento no es económicamente conveniente.]

[Si le coût total calculé (exprimé en $/ha, kg/ha ou dans les unités choisies lors de la saisie des données) dépasse l'augmentation attendue du revenu (exprimée dans les mêmes unités que le coût total), le traitement n'est pas économiquement avantageux.]

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Conclusions

- The web page is a guide to calculate the treatments cost.

- The web page is free and open access. It works from PC, mobile phone, tablet, any device with Internet access. It is portable, fast to calculate, easy to use and requires little data input. As far as we know there are not similar web pages or applications.

- Requires internet connection only to load the web page, then it can be used offline.

- It is available in 5 languages (English, Spanish, French, Portuguese, Arabic).

- The page has supporting documentation in English and Spanish.

- The presented web page would help to decide the control of the main agricultural pests of many African countries.

- Depending on the progress in the use of this web page, it is possible to develop other similar and complementary tools.

INTA-AAPRESID África agreement

https://cultivaresargentinos.com/africa/

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