



EVALUATION REPORT 2020

YOUNG SCIENTISTS TANZANIA (YST)

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INTRODUCTION

Young Scientists Tanzania consists of two complementary components, a national Science Outreach Mentoring Programme and an annual Exhibition and Awards Ceremony. These components work hand-in-hand to deliver a transformational impact in Tanzania and a Science for Development model that can be transferred to any developing country.

Since 2011, YST has been delivering a comprehensive Science Outreach Mentoring Programme in secondary schools throughout Tanzania. This mentoring approach builds scientific capacity, confidence and engages young secondary school students with early research methodologies, opportunities and trajectories.

Unlike other international Young Scientist Science Fairs, the mentoring of teachers and students is a key focus and bulk of the work of the Young Scientists Tanzania-Science for Development approach.

YST Science Advisors and Regional Coordinators conduct regional workshops for students and teachers from all thirty regions in Tanzania. The workshops introduce teachers and students to context-based, learner-centered scientific research and scientific methodologies. They build capacity for enthusiastic teachers to generate project topics relating to Science for Development and Sustainable Development Goals.

The annual YST Exhibition and Awards Ceremonies has been showcasing the success of this transformative programme for the last ten years.

In 2020, YST faced many challenges posed by the COVID-19 pandemic. Child protection, health and safety measures had to be implemented to align with the Government COVID-19 rules and regulations. Many innovative strategies were applied to restructure and deliver YST 2020. The YST Digital Mentoring Framework allowed the student research to continue and the YST Digital Judging Framework facilitated the remote judging of the projects. The use of digital technology over the years, allowed Young Scientists Tanzania to leapfrog, restructure and deliver these new innovations in 2020.

The first outreach programme to all regions was conducted in early 2020 instead of March as in former years. An online digital platform was developed for all students to submit their applications before the earlier closing date, 13th March and before the closure of all secondary schools.

Digital technologies transformed and allowed the mentorship programme to continue while the schools were closed.

INTRODUCTION

YST developed an innovative approach to allow the annual exhibition and Awards Ceremony to be delivered in 2020. From early March work began on strategies to deliver a Virtual Exhibition and Awards Ceremony. The YST Virtual Exhibition and Awards Ceremony 2020 was broadcast on National TV on the 1st August 2020. The YST Virtual Awards ceremony was also streamed on Facebook/Twitter and Instagram.

Celebrating the 10th Anniversary of YST in 2020 was a remarkable achievement and through resilience, fortitude and foresight, YST withstood the challenges of this pandemic.

The YST 2020 Virtual Awards Ceremony, Judging and Exhibition has led the way in innovation

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**YST is striving to inculcate “Science for Development “
movement from grassroot level to policy makers of Tanzania.
To ensure sustainable development of Tanzanian
human resource to support the Industrialisation objectives.**

THE YOUNG SCIENTISTS TANZANIA – SCIENCE FOR DEVELOPMENT MODEL

The mentoring of teachers and students is the main activity and work of the Young Scientists Tanzania-Science for Development approach.

The Regional Coordinators (all professional science teachers) are recruited by YST in each region to promote the model, deliver the workshops and liaise with all the schools in their regions. They organise the local regional logistics associated with the outreach programme and exhibition. The coordinators visit schools to support and encourage the students to undertake research outside the formal curriculum. The teachers and students are provided with a digital and hard copy of the YST project poster template which highlights sections representing key stages in the research process: introduction, method, results, analysis, conclusions, recommendations and abstract. This method breaks down project work into less intimidating blocks. Students are encouraged to use the YST Factfile that clarifies the rules and regulations that govern the YST exhibition.

As research progresses throughout the year, the students are encouraged to digitally forward any queries or research data, to the YST Science Advisors and Regional Coordinators. Requests for further information, mentoring or advice is checked and the YST team liaises with the teacher. This method of communicating and transferring data, requesting information and sending draft poster templates to schools works smoothly once teachers and students got used to electronic communication.

The team of YST Science Advisors and Regional Coordinators, advise the students and ensure the student projects make the progression from a research idea to a formal application to present their research at the Annual exhibition.

Following these mentoring visits, students submit a formal project proposal along with a completed application form to YST before the agreed closing date.

All project applications are screened by a panel of YST Judges. The selected projects receive further mentoring. The YST judging guidelines are shared with all teachers and students for transparency and to provide the necessary guidance on the preparations required before students present their projects at the exhibition in Dar es Salaam.

YST liaises with regional coordinators or directly with teachers in some instances via school visits, phone and email communication.

In 2020, YST introduced the digital mentoring framework in order to mitigate the effects of COVID-19.

RESILIENCE TO COVID-19 PANDEMIC CHALLENGES & RESTRUCTURING

Resilience to threat of COVID -19 Challenges

In 2020, COVID-19 turned Europe, Asia, the Middle-East and the Americas upside down and from early 2020 the continent of Africa began bracing itself for the impact of the virus.

YST Co-founders, Dr Gozibert Kamugisha and Joseph Clowry were tracking the spread of the Corona virus in Wuhan, China from mid-December 2019. Informed by the experiences of the SARS outbreak 2002-2004, the potential challenges for YST in 2020 were highlighted in early January 2020.

Early research by international epidemiologists indicated this highly contagious virus could have a serious global impact and countries would have to act in haste to prevent the epidemic becoming a full-blown pandemic.

Informed by the Wuhan experiences, YST was advised it would only be a matter of time other countries, including Tanzania would be exposed to the virus due to travel links with infected countries. As there was no vaccine or retroviral drugs the exposed countries would have to put in place travel restrictions and social distancing. YST was advised that all public events, conferences, systems and exhibitions might need to be cancelled in countries exposed to the virus as the virus was highly infectious and contagious. The research informed that creative and innovative measures would be required to ensure the transformational work of YST could continue.

Following this advice, the YST Team conducted the science outreach immediately in early January, instead of February and March as in former years. It was also decided to bring forward the closing date for project submissions on 13th March instead of 31st May 2020. To mitigate the effects of COVID-19, it became apparent that a new model and approach would have to be developed. Face to face contact with students and teachers would have to be avoided, social distancing maintained and all travel would have to be cancelled.

YST was advised that the developing models for the pandemic predicted Africa would be facing the looming COVID-19 challenges in the late Spring /Summer of 2020 so it was necessary to act with haste. YST Science Advisors, Team and Board took up the challenge and engaged with many expert colleagues and consultants to develop a resilient innovative restructuring plan to hold a Virtual YST 2020. It was essential that students and teachers would not meet once the schools were closed and all travel would have to be cancelled.

The YST Child Protection manual was updated to educate and mitigate the effects of COVID-19.

SCIENCE OUTREACH PROGRAMME

Science Outreach Regional Workshops (January)

The YST Science Advisors, working with the 28 Regional Coordinators, facilitated workshops for all regions in Tanzania in early January 2020.

Teachers were provided with travel, accommodation and meals expenses in order to attend the workshops.

Over 177 Schools were represented at the workshops. The teachers were trained in scientific methodologies, generation of project ideas and assisted and mentored in appropriate methodologies for their projects.

The Science outreach regional workshop involved thirty-one (31) regional level workshops conducted by YST Science Advisors and trained Coordinators. Schools were presented with the YST Factfile. These workshops were designed to introduce teachers to the concept of YST and context-based learner-centered scientific research. They also served as an aid to enthusiastic and pro-active teachers to brainstorm project topics relating to Science for Development and to encourage students to undertake research projects for entry in the competition/exhibition. In some regions that had previously participated in YST, teachers and students were already working independently, on projects for the exhibition.

Following the workshop, the YST team liaised and continued to assist and mentor the teachers and students.



SCIENCE OUTREACH PROGRAMME

Mentoring of Teachers & Imminent Covid-19 Threat (February)

As COVID-19 was fast becoming a pandemic, it necessitated the need to act quickly and to develop highly creative innovations and restructuring of YST activities.

Fortunately, YST was ahead of the curve. YST Co-founders, Dr Gozibert Kamugisha and Joseph Clowry who had studied together in Ireland some years earlier, were familiar with the experts modelling the virus and were very aware of the direction this pandemic was taking. As a result, YST were ahead in their planning to off-set the challenges posed by COVID-19.

Pre-emptive work began on a comprehensive strategic plan to mitigate the effects of the virus. The strengths, weakness, opportunities and threats posed by COVID-19 were analysed in detail by the YST Management Team, the Science Advisors and YST team. YST Board were informed of the emerging research and they fully backed the efforts to restructure the programme to mitigate the effects of COVID-19.

YST put in place a re-structured plan that would build on the foundations put in place since 2011 and embrace modern technology, remote learning and research. This remote learning and delivery would be an exemplary program and show how, with creativity, restructuring and innovation, the devastation of COVID-19 could be avoided and the potential dangers of COVID-19 transmission would be eliminated for our teachers and students.

Mentoring of projects was conducted online, using mobile phones – Calling, SMS and use of WhatsApp. No travel or face to face meetings was required in the new re-structured program.



SCIENCE OUTREACH PROGRAMME

Project Screening & First Selection of Projects – COVID-19 & the New Plan of Action (March)

Over the last 10 years, YST has become a very high-profile and structured STEM initiative in Tanzania. Each year, following the mentoring visits, students submit a four hundred-word project proposal along with a completed application form to YST before a fixed closing date. This year a record 604 projects were submitted to YST and applications were made through the YST online platform. The deadline was 13th March 2020.

The YST Science Advisors evaluated and screened all 604 projects remotely and digitally, from which 140 projects were selected to participate in the new restructured format for the YST 2020 Award Ceremony & Exhibition. This phase was completed by 31st March 2020.

The rules and regulations for working in COVID-19 times were developed and our Child Protection Policy was updated to highlight the health and safety issues and regulations. When schools were closed all teachers, students and regional coordinators participating in YST 2020 were advised on the rules and regulations.

No physical contact between students and teachers and regional coordinators. All communication was shared digitally. No travel between students and students and /or teachers and /or regional Coordinators and all communication between students and teachers and regional coordinators to be through officially administered and monitored WhatsApp's Groups.

SCIENCE OUTREACH PROGRAMME

Project Mentoring and Development Support and Final Selection of Projects (April & May)

The 140 Projects selected were mentored by science advisors with their regional coordinators through WhatsApp groups.

The 31 Regions were divided into three geographical groups each coordinated by the YST Science advisors. The Science Advisors worked in partnership with their regional coordinators in the respective groups.

As schools were closed, teachers and students were separated from each other. Mobile Voucher allowance was provided to teacher and student to allow effective communication and facilitate mentoring and submission of the Project report.

Students and teachers were encouraged to develop their projects by adhering to the scientific method and dividing their report book into blocks such as Abstract, Introduction, Method, Results, Analysis, Conclusions and Recommendations. This method of breaking down tasks into manageable sections proved again to be of great assistance in ensuring that projects were ready.

By 30th April 2020, Project Reports were submitted by Students for further review/screening by the YST Science Advisors

One hundred and twenty-three projects (123) were selected based on the evidence/supporting research submitted. The selection was completed by 3rd May 2020. All this work was done remotely using Zoom by YST Volunteers, Regional Coordinators, YST Team and YST Science Advisors.

The Projects were further developed between 3rd May and 13th May in preparation for the Project Poster productions. Mobile Video Recording and Audio Recording guidelines were sent to the students to assist them with their project presentation.

YST 2017 Winner, Eric Simon provided a demonstration video for the students based on the presentation guidelines. The students were informed that these videos and audio recordings would have to be submitted by 1st June 2020. Mobile Voucher allowance was provided to teacher and student to allow effective communication and facilitation. YST Volunteers, Regional Coordinators, YST Team and YST Science Advisors coordinated this process remotely.

AWARDS CEREMONY PROGRAM PRODUCTION AND ONLINE SCIENCE EXHIBITION

Project Judging & Award Ceremony Production (June)

Final submission of completed videos was done by 1st June 2020.

Under the supervision of the YST Chief Judge, Dr. Brendan Doggett and his panel of 28 Judges (From Tanzania, Ireland, United Kingdom and Kenya) the project were judged in complete confidence to uphold the integrity of the YST judging process. This judging was conducted over a two-week period between 1st June to 16th June 2020. An innovative Judging online platform was developed to facilitate this remote judging.

The restructured plans and running order of the proposed Virtual Award Ceremony was shared with sponsors on the 5th June.

Because of the Covid-19, Sponsors were informed they will have to make pre-recorded videos for the Award Ceremony between 22nd June to 28th June. The Award ceremony was scheduled for the 1st August 2020. All sponsors were reminded of the COVID-19 regulations.

Ongoing Logistical Arrangements were put in place to deliver the YST 2020 Award Ceremony including; Procurement of Video Production company, procurement of the Awards and Trophies, establishing contact tracing team for YST Winners and a Team to coordinate certificate, trophy and medal presentation to the winners. A Team was also set up to follow up on the development of the videos of the winners. These videos were used in the Awards ceremony program.

PURPOSE OF EVALUATION

In 2020, YST introduced many innovative strategies and necessary interventions to mitigate the challenges posed by COVID-19. In the previous nine years, between 2011 and 2019, the YST programme followed a similar model and approach: Regional Coordinators and Teacher Outreach workshops in the regions, mentoring visits to schools, Annual Capacity Building Workshop for all regional Coordinators in Dar es Salaam, The gathering of students, teachers and regional coordinators for the annual YST Exhibition and Awards Ceremony, YST Annual Exhibition in Dar es Salaam, Judging of projects at the annual exhibition, Annual Awards Ceremony in Dar es Salaam.

In 2020 the introduction of the YST Digital Mentoring Framework, Digital Judging Framework and Virtual Exhibition and Awards Ceremony at short notice was a new and necessary direction for YST.

The objective of this evaluation is to gather information that can assist and inform decisions and strategies for the future direction of YST.

EVALUATION BACKGROUND DATA

In September 2020 an evaluation questionnaire was circulated to all the Students, Teachers, Regional Coordinators and Sponsors involved in YST 2020.

From a total of 246 students who participated in YST 2020, 157 responded

From a total of 92 teachers who participated in YST 2020, 81 responded.

From a total of 28 regional coordinators who participated in YST 2020, responded.

From a total of 13 Sponsors, 9 Sponsors responded.

EVALUATION

1. Outreach Programme

The YST Science Mentoring Outreach programme was launched in August 2011 and is now in its 10th iteration. The programme follows a relatively fixed structure of two teacher centric workshops at the start of each year. Following the project submission, two student centric workshops are held in each region. A Regional Coordinator in-service workshop takes place after the shortlisting of projects.



YST Regional Coordinators at in service training workshop

In January 2020, the first outreach workshops took place in each region. Each workshop was attended by the relevant Regional Coordinator and 15 invited teachers.

Regarding the Outreach Programme, 64% of coordinators were *very satisfied*. The remaining 36% were *satisfied*. While remote mentoring has been a part of previous exhibitions, it became the primary method for YST2020. While 84% of the coordinators were *very satisfied* or *satisfied*, 16% were *dissatisfied*.

One coordinator remarked:

“Visiting schools during the process is very important, it promotes encouragement, and working spirit to both student and teachers.”

Teachers who responded to the evaluation have participated four times on average in previous YST outreach and exhibitions. For 16% of the teachers YST 2020 was the first occasion to participate.

Teachers significantly depend on Regional Coordinators as the main source of information about YST. More than half the number of teachers (58.02%) reported that they heard about YST for the first time through Regional Coordinators whereas more than a quarter of teachers (27.16%) got the information from fellow teachers. A fewer number of teachers (14.81%) got the information about YST from social media as indicated in Table 1.

EVALUATION

1. Outreach Programme

One teacher noted:

Justine Bahati a former student at Bariadi Secondary School introduced the program at school after joining us for A-level studies

For students who participated in this year's programme, 91% were doing so for the first time, 5.7% had participated on two occasions, 0.63% had participated on 3 occasions and 0.63% had participated on 4 occasions. The majority (74.5%) of students who responded, heard about YST through their *teachers* with 21.66% heard from fellow *students* (See Table 1).

Table 1: Sources of Information about YST

No	Source	Student %	Teachers %
1.	YST Coordinator	12.10	58.02
2.	Newspaper	0	2.47
3.	Social Media	4.46	14.81
4.	Teachers	74.52	27.16
5.	Students	21.66	
6.	School Management	10.19	7.41
7.	Other	1.27	7.41

In-Service training did not occur for Regional Coordinators in 2020.

Feedback from coordinators included:

"I would like to advise the YST Management at least to conduct regional coordinators workshop at least twice per year, first before the screening of the project as we always do and second after exhibition so as to make a critical evaluation and see where we have fail and where we have won and what are we supposed to do for improvement."

Key Observations:

- The Outreach programme is very positively received by Teachers and Coordinators
- A clear channel of communication exists between YST organisers and their key participants (students) ensuring a two-way flow of accurate information between students and YST
- In-service training is a key motivator of Regional Coordinators
- School Management are not key sources of information on YST

Key Recommendation:

- YST should consider alternative methods of In-Service training for Regional Coordinators for YST2021 if necessary
- School visits are considered very important. Where possible YST should aim to complete school visits as previous years.
- School Management are key STEM Stakeholders. YST should take specific actions to involve School Management in their activities

EVALUATION

2. Online Application

Following the Outreach Programme, students submit a formal four hundred-word project proposal along with a completed application form to YST before the agreed closing date. The online application process was identical to previous years and 80% of coordinators rate the process as *very easy* or *easy*. The remaining 20% stated that it was a *difficult* process. No coordinator thought it was *very difficult*.

The number of coordinators who found it was a *difficult* process correlates to the number of coordinators, for whom this was their first or second year in the role.

The majority of teachers, 58.02% perceived the online project application as *easy* to process, 19.75% perceived it as *very easy* to process and 22% of teachers found it a *difficult* or *very difficult* process (See Table 2).

The Regional Coordinators have responsibility for supporting teachers during this process. Some teachers reported Regional Coordinators as being *extremely supportive* (39.51%) but the majority (58.02%) of the teachers said that the Coordinators were *very supportive*.

Table 2: Rating of Online Application Process

Rating	Teachers %	Students %	Coordinators %
Very easy	19.75	19.11	24.0
Easy	58.02	50.96	56.0
Difficult	17.28	26.11	20.0
Very difficult	4.94	3.82	0

For students, 70% rated the process of the online Project Application process as *very easy* or *easy*. However, 26% rated the process as *difficult* (See Table 2).

Teachers are the key link between students and YST. In the evaluation, 73% students found their teachers' support as *extremely valuable*, 24.84% found it *very valuable* with three students finding it *not so or not at all valuable*. With regard the Regional Coordinator students' feedback was broader, with 49% saying they were *a great deal supportive*, 38.22% thought they were a lot supportive, with the remainder, *a little or not at all supportive* (See Table 3).

Table 3: Amount of Support from Regional Coordinators

Rating	Students %	Teachers %
A Great deal supportive	49.04	39.51
A lot supportive	38.22	58.02
A little supportive	11.46	2.47
Not at all supportive	1.27	0

EVALUATION

2. Online Application

Feedback from students included:

- There should be short seminar or full instruction on procedures or things students should follow since it's the first time for others to participate
- submission of projects has become so tough since we received the update (news) so lately.
- language barrier due to use of English language as the language of presentation report writing and get information thus it Hinder some talented students
- you should find another way because the use of internet takes a long time to fill the details

Feedback from teachers included:

- Online participation proved to be very challenging, as it wasn't easy to provide assistance to students due to the distances apart and network problems depending on the student's area of residence, also students lacked full support from the school in providing tools and materials needed for the project.

Key Observations:

- The consensus of Teachers, Students and Regional Coordinators is that the Online Application process is an *easy process*. However, a number of Teachers found it a difficult process
- Teachers reported that their Regional Coordinators *were a lot supportive*.

Key Recommendation:

- YST needs to determine what aspects of the Online Application Process was difficult for the teachers referenced above.
- YST should be mindful of schools who have difficulty with Internet access and continue to accept postal applications or allow RC's complete the applications on school's behalf.

EVALUATION

3. Remote Screening and Judging of Projects

All projects are screened. All selected projects receive further mentoring and the judging guidelines are shared with all teachers and students, to give the necessary guidance on the preparations required before students present their projects. YST liaise with Regional Coordinators or directly with teachers in some instances via school visits, phone and email communication

For students, 30% were *very satisfied* with the information provided by YST on project report submission, project poster presentation and project video presentation at YST2020, 61% were *satisfied*. However, 7% were *dissatisfied*.

The judging process also moved online for YST2020 and took place remotely with Judges from six countries involved. The process is described in detail in Section 9. While 72% of coordinators were *very satisfied* or *satisfied* with the process, 28% were *dissatisfied*.

Feedback from coordinators included:

- There is a need for general feedback to coordinators regarding their individual schools, why they won or didn't win so they can also give some feedbacks to teachers and students
- The main challenge for this year was a Covid-19, next time if we will present online, we need enough time to practice

Key Observations:

- The screening of projects works well, with the majority of participants satisfied with the process
- The online judging framework also worked well this year and is reported as a clear and transparent process.

Key Recommendation:

- YST should aim to complete the screening process as soon as possible. Some students reported a delay in receiving notification on whether their project was accepted this year
- YST should provide a summary of results including Judges Comments to Regional Coordinators to disseminate to students and teachers as soon as reasonably possible after the exhibition.
- Regional Coordinators responded that they are keen to be involved in the Judging Process. YST should include a number of the coordinators on future judging panels. This can be incorporated into their In-Service Training and will provide long term benefits to YST, the Coordinators and the teachers and students they support.
- It is clear the judging process generates a significant amount of useful data for future analysis. Storage of results for future accessibility may become a challenge for YST. YST should implement a secure storage solution so that all project results are accessible for the future

EVALUATION

4. Relationships/Support/Linkages – YST Team, students, teachers and coordinators

More than half the number of teachers (58.02%) were *satisfied* with the information provided by YST regarding their project submission, project selection and project presentation at YST 2020. Those who were *very satisfied* with the information provided were 32.10%.

More coordinators, 56% felt *very satisfied* and 44% were *satisfied* with the support they received from YST.

For students, 30% were *very satisfied* with the information provided by YST on their projects report submission, project poster presentation and project video presentation at YST2020, with 61% *satisfied*.

However, 8% of Teachers and 7% of Students were *dissatisfied* (See Table 4).

Table 4: Level of Satisfaction with Information from YST

Rating	Students %	Teachers %	Coordinators %
Very satisfied	30.57	32.10	56.0
Satisfied	61.15	58.02	44.0
Dissatisfied	7.01	8.64	0.0
Very dissatisfied	1.27	1.23	0.0

Feedback included:

- “*Motivations to mentoring teachers is still a challenge*”.

Key Observations:

- More Students and Teachers were *satisfied* rather than *very satisfied* with information from YST.
- The majority of Coordinators were *very satisfied*. The results indicate the flow of information between Coordinators and Teachers has opportunity for improvement.

Key Recommendation:

- YST should develop a Communication Plan. This Plan will outline the ‘owners’ of information and how it is disseminated. This Plan will also address issues highlighted in Section.3 regarding the screening process.

EVALUATION

5. Views on the Virtual awards ceremony and exhibition

The exhibition and awards ceremony also moved online for YST2020. The majority of coordinators 56% were satisfied with both aspects this year, 12% very satisfied and 32% were dissatisfied as indicated in Table 5.

About 54.32% of teachers were satisfied with the online awards ceremony and exhibition whereas 11.11% of teachers were very satisfied. More than a quarter number of teachers (30.86%) were dissatisfied with the online awards ceremony and exhibition (See Table 5).

The sponsors' satisfaction for this year's televised YST 2020 Award Ceremony and Exhibition rated very highly, 66.6% were very satisfied and 33.3% were satisfied.

Table 5. Rating of Online Exhibition and Awards Ceremony

Rating	Teachers %	Coordinators %	Sponsors %
Very satisfied	11.11	12.0	66.67
Satisfied	54.32	56.0	33.33
Dissatisfied	30.86	32.0	0.0
Very dissatisfied	3.70	0.0	0.0

Feedback included:

- *“Will be much effective if we all teachers and students from different regions could gather for exhibitions award ceremony so as to acquire more experiences rather than online TV presentation”*
- *“YST Should conduct the exhibitions as previous years NOT On line as this year.”*

Key Observations:

- The majority of Teachers and Coordinators were *satisfied* with the online exhibition and awards ceremony
- The majority of sponsors were *very satisfied*.
- From the comments received, it is clear Teachers and Coordinators prefer the physical interaction of previous exhibitions.

Key Recommendation:

- If repeated next year, YST should consider ways to make the online award ceremony more exciting for students and teachers. This could include including students or teachers as co-hosts

EVALUATION

6. Impact of YST Model on capacity building

Students

All students felt their involvement in YST adds value to the development of the country.

All students who responded felt that their involvement with YST would encourage them to support other students to get involved in scientific research and 78% stated that it would *definitely encourage* them.

The majority of students (89%) thought their involvement in YST would *definitely encourage* them to study science subjects in secondary schools and 10% would *probably encourage* them, 82% felt their involvement in YST *will encourage them* to study science and technology in the university or college level and a further 17% stating it would *probably encourage*.

Finally, 99% felt their involvement in YST will encourage them to work or have a profession in science and Technology related fields with just two students reporting it *probably would not encourage* them.

Regional Coordinators

All coordinators (100%) agreed that involvement in YST added to their status within their region and improved their confidence in communicating Science for Development. They also agreed that participation encouraged them to look at other opportunities in Science and Technology. They reported that their involvement improved their research skills and encouraged them to support other teachers to participate in the program (See Table 7).

The majority of coordinators, 88% felt influenced to teach science in a more practical way due to their involvement and 80% believed it would encourage more of their students to look at STEM as a career, as indicated in Table 6.

Table 6: Influence of YST in Teaching Science Practically

Rating	Teachers %	Coordinators %
Definitely influenced	88.89	88.0
Probably influenced	9.88	12.0
Probably has Influenced	1.23	0.0
Definitely has not influenced	0.0	0.0

Teachers

A significantly high number of teachers (88.89%) reported that their involvement in YST as project mentors has influenced them to teach science in a more practical way than they did before. About 9.88% were not certainly sure if the YST program has influenced them to teach science in a more practical way (See Table 6).

All teachers (100%) reported that their involvement in YST encourage students in their schools to study

EVALUATION

6. Impact of YST Model on capacity building

Teachers' involvement in YST outreach program was reported to have significant impact on teachers as 95.06% of them said that their scientific knowledge/methodologies and research skills have improved a lot and 4.94% said their scientific skills and knowledge improved a little (See Table 7).

Table 7: Influence of YST on Improving Scientific Skills

Rating	Teachers %	Coordinators %
Improved a lot	95.06	100
Improved a little	5.94	0.0
No improvement	0.0	0.0

More than three quarters of teachers (77.78%) involved in YST said that definitely they would encourage other teachers to be involved in YST and 22.22% of them said they would probably do the same.

About 76.54% of teachers confidently reported that their involvement in YST will very likely encourage their students to work or have a profession in science and technology related fields in future.

Almost all teachers (98.77%) were of the opinion that their participation in YST encouraged them to look at further opportunities in science and technology. This shows that YST has a great impact in shaping teachers' dreams and plans in science and technology.

Apart from improving teachers' scientific knowledge and skills, involvement of teachers in YST program improve teacher's status as 97.53% of all teachers proudly reported that their status has improved after their involvement

About 98.7% of teachers reported that their involvement in YST has significantly improved their confidence in communicating science for development

Feedback included:

- *"I do appreciate the YST because enhanced me to involve in the project which was very logically and usefully in my municipal and helped to widen my skills"*

Key Observations:

- Participation in YST is reported to have many positive benefits to students, teachers and coordinators.
- The benefits reported are in line with the reported YST - Strategic Objective

Key Recommendation:

- These direct and indirect benefits need to be promoted to perspective participants.
- As per recommendations in Section.1 highlighting these benefits may be the route to increased involvement of School Management.

EVALUATION

7. Suggestions and Areas for Improvement

Teachers:

- *Will be much effective if we all teachers and students from different regions could gather for exhibitions award ceremony so as to acquire more experiences rather than online TV presentation*
- *Motivations to mentoring teachers is still a challenge. Example recognizing the extra time taken by these teachers for YST matters since, the schools time tables nowadays are so busy. Also encouraging scholarships for those teachers who spent from 5 years and above dealing with YST issues to their schools, will arouse much interest example supporting even one teacher per year*
- *YST should try to increase the number of schools per region*
- *Online participation proved to be very challenging, as it wasn't easy to provide assistance to students due to the distances apart and network problems depending on the student's area of residence, also students lacked full support from the school in providing tools and materials needed for the project.*
- *I would like to advise the YST management that the mentors together with RC's pass to each school and see the project developments at least twice or even more this will help students, teachers, RC's and mentor to sit and discuss a lot and build confidence to students and teachers*
- *I have one comment about YST 2020, if next time it will be online based, it will be better if students could be asked questions about their projects through video conferencing instead of depending on reports and other written documents during judgement of students' projects. By the way YST is so amazing helping students to involve themselves in science and technology and make them think more about new ideas and creativity. KEEP IT UP & WELL DONE*

Students

- *I advise if possible, to make some exhibition days region wise before gathering for national exhibition in Dar es salaam.*
- *YST is very important in our lives as it aids to open our minds concerning social and scientific matters*
- *Should have a programme where all the award winners meet to discuss and share different constructive ideas, mostly scientific ideas to widen their scope of opportunities, and to be given chance to join, participate and show their contribution in the YST team*
- *The Video presentation was discouraging therefore I advise you to use an open exhibition which will help us to meet with other students and share experiences and exchange ideas. Also, the open exhibition helps students to prepare well and build confidence.*

EVALUATION

7. Suggestions and Areas for Improvement

- *My opinion is to allow students to participate practically and without using online methods of participation.*
- *The regional coordinators have to increase their involvement in pre assessing the projects.*
- *YST has to provide financial support to help the students in accessing the requirements of the respective project*
- *The use of the internet is not accessible to everyone because it can be expensive and not everyone has a smartphone but also there is a language barrier due to use of English language as the language of presentation, report writing and getting information. I recommended to use Kiswahili if possible but if not probably limits participation of many gifted science students'*

Regional Coordinators

- *All coordinators should be fully involved in the project's presentation for selection to avoid mentors and student's confusion on whom to respond to. i.e managerial hierarchy.*
- *By increasing workshops and training to coordinators.*
- *YST should avoid passing information to students and teachers without informing a coordinator*
- *As regional coordinator we need more skills on research so as to help teachers on their projects. as coordinator I thank YST team for what we did during COVID-19, very amazing despite of many challenges*
- *I would like to advise the YST Management at least to conduct regional coordinators workshop at least twice per year, first before the screening of the project as we always do and second after exhibition so as to make a critical evaluation and see where we have failed and where we have won and what are we supposed to do for improvement.*
- *I, with my fellow teachers and students wished to hear the presentations of the projects of other schools via online videos as by this time we had no opportunity of listening to their projects so that we may learn from each other and improve as well. We also had a wish to have the poster templates as we used to get before, because they inspire fellow students to learn from others and sometimes, they act as achievements for our YST clubs in our schools and regions when it comes to sharing of experiences. This time we missed the dinner which was scheduled for the winners. Our teachers and students had that wish so as to broaden the exposure.*

EVALUATION

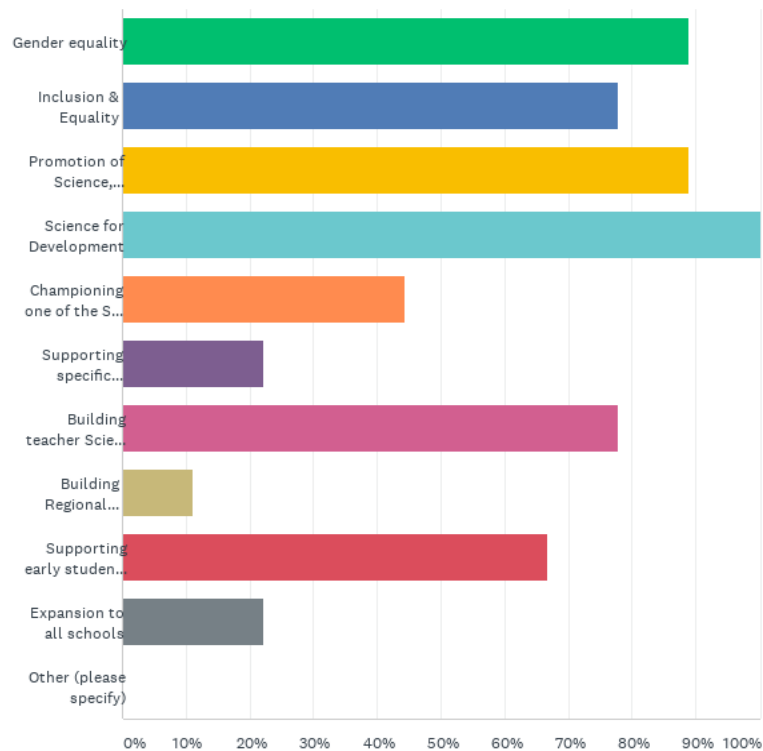
8. Sponsors Evaluation of YST 2020

The Sponsors of YST2020 have been supporting the programme on average for eight years since it was launched in 2011. All sponsors mentioned they support YST in order to build capacity in STEM and to improve education skills in science subjects in order to increase enrolment in science and engineering subjects.

“We strongly believe in the Science for Development model and particularly the grass roots approach of YST.”

Sponsors listed *Science for Development* as the key performance indicator followed closely by *Gender Equality* and promotion of *STEM*. Inclusion and equality and capacity building for teachers were also important.

Q3 Which of the following key performance indicators are most important to you? (Tick as many as relevant)



The Online Award Ceremony met the expectations of all sponsors.

The sponsors' satisfaction for this year's televised Award Ceremony and Exhibition rated very highly, 66.6% were *very satisfied* and 33.3% were *satisfied*.

Only one sponsor was involved in the remote judging process and this sponsor rated the process as a *very high-quality* process.

Considering the COVID-19 pandemic presented many challenges, 44.44% of sponsors rated the processes implemented by YST to deliver the YST Virtual Program as *very high quality* and 55.56% as *high quality*.

EVALUATION

8. Sponsors Evaluation of YST 2020

Sponsors were particularly impressed by the digital award ceremony, digital project presentations and sponsor video presentations at the awards ceremony (see Table 8 below).

Table 8: Sponsors' preference of YST 2020 Elements

Element of YST 2020	%
Digital Project Presentation	67
Digital Award Ceremony	67
Sponsor Video Presentations at Award Ceremony	67
Digital Project Screening & Selection	56
Remote/Virtual Judging	56
Online Project Exhibition	56
Sponsor Remotely Presenting their Awards	56
Remote/Virtual Mentoring	44
Digital online application	33

Sponsors were very impressed and reported that YST succeeded beyond expectations considering the challenges posed by COVID-19.

Feedback included:

- *The team was very fast to adapt and implement the virtual digital event which was a huge success*
- *We were hugely impressed with the adaptability, professionalism and speed with which YST moved to an 'online' world in response to Covid 19. Hugh congratulations to the whole YST team*
- *Very impressed with the great job the YST team has done*
- *The team did a wonderful job in moving YST online this year. Given most organisations are moving in a similar direction, everyone understands the difficulty with this. Nevertheless, the judging, exhibition and awards ceremony was run well and it was a pleasure to take part in*

EVALUATION

8. Sponsors Evaluation of YST 2020

- *It was worth pursuing with your plans (YST plans) to deliver the outreach program and exhibition through a digital platform*
- *Well organised in light of COVID-19 challenges*
- *YST 2020 ventured into uncharted territory and succeeded beyond expectations. However, there is room for improvement going forward*
- *Think about extending science classes to secondary school to increase access to quality education to most schools*

Key Observations:

- Sponsors were particularly impressed by the digital award ceremony, digital project presentations and sponsor video presentations at the awards ceremony

Key Recommendation:

- YST should consider ways to make the online award ceremony more exciting for students and teachers. Also, YST hopes to have the social and physical interaction as in previous years when the situation improves. Other suggestion is a hybrid model combining elements of virtual and physical exhibition.

EVALUATION

9. YST Digital Judging Framework

The introduction of the Digital Judging Framework was another agile response of YST to the challenges posed by COVID-19. In keeping the methodology and process similar to previous exhibitions, such as time allocation per judging, assessment criteria and shortlisting, the move online was a success.

Judging took place from 25th May - 8th June 2020 and involved 28 judges working remotely across 5 countries. The distribution of projects, monitoring and control of scores was managed centrally by the Judging Coordinator.

The Judging Framework consists of 5 stages:

STAGE 1: Allocation of projects

Communication with all judges through zoom, phone or email to ensure there is a common understanding of the standards and judging policy.

Projects were randomly allocated to one of 10 pots (approx. 12 projects per pot) resulting in a regional, and category spread. A pot is a Google Drive folder accessible only by a unique weblink issued only by the Judging Coordinator. This ensured that only Judges allocated a pot can see those projects.

The online assessment sheet was a general scoring sheet applicable for all categories and was a Google Form accessible by another unique weblink. Once an assessment sheet is completed, the responses are visible to the Judging Coordinator on a database for cleaning, normalizing and analysis.

Each pot was randomly allocated to **three** judges.

STAGE 2: Completion of first round of judging.

Each judge was assigned a pot, they read the project report and watched the accompanying video presentation from the students.

They completed the online assessment sheet for each project and confirmed completion with the Coordinator.

Judging continued until all projects were judged three times.

STAGE 3 Completion of first round of judging.

The marks were checked by the Judging Coordinator and the top four projects in each category were highlighted and progressed to the second round of judging. This was 25 projects in total selected in stage 3.

EVALUATION

9. YST Digital Judging Framework

STAGE 4: Completion of second round of judging

For the second round of judging, the top projects were randomly allocated to five pots again ensuring a spread of projects in each. Distribution of pots for judging was similar to previous rounds and the online assessment forms for each project was completed.

The database was normalized by the Coordinator to allow cross comparison and the **top** project in each category was determined.

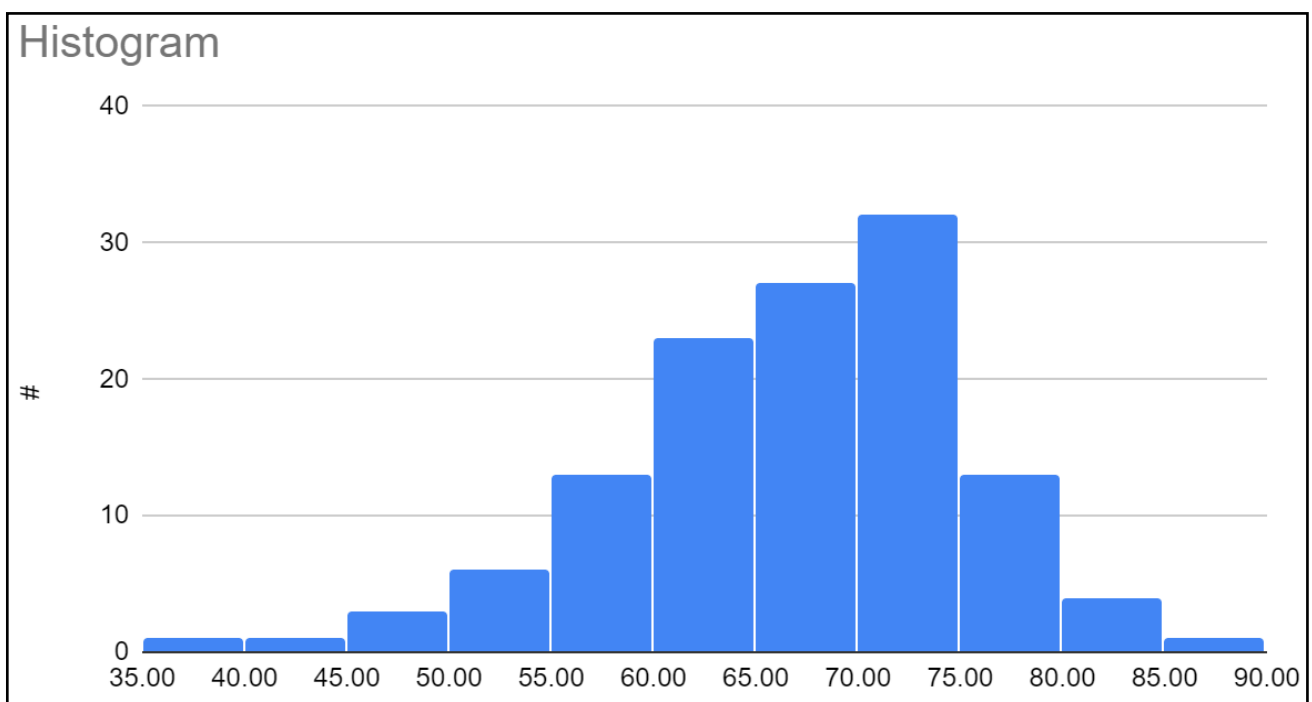
STAGE 5: Meeting for final judging.

A review meeting of the Coordinator and the Technical Team of YST took place. They discussed the merits of the top six projects and based on judges' feedback, devised a list of specific questions for the students. These questions are passed to the students who videoed their answers and emailed the videos back to the coordinator.

The group reached a consensus on the overall winner based on a number of factors including:

- Final ranking and score
- Feedback from judges
- Feedback from regional coordinators
- Novelty, degree of independence and innovation of project
- Impact of the project in terms of Science for Development
- Communication and presentation skills of the students

All results from the judging process are available for review. In summary the average score for all projects this year was 69%, with a standard deviation of 12% (compared to an average of 66% in 2019). The spread of scores is shown below (5 projects scoring >80% and 5 projects scoring <50%).



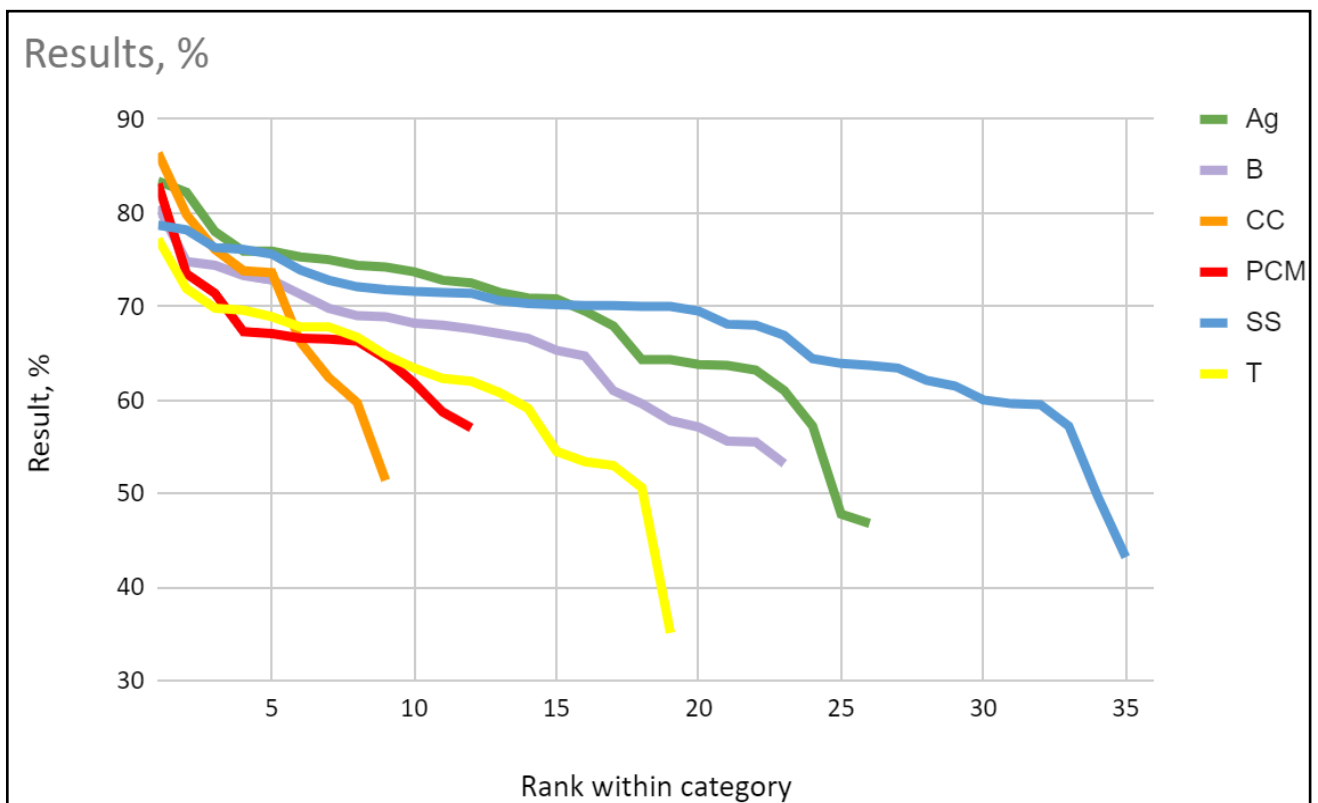
EVALUATION

9. YST Digital Judging Framework

The figure below shows the average corrected score of all exhibited projects, displayed per category. This year YST introduced two new categories resulting in the following available to participants:

1. Technology & Computer Sciences
2. Agriculture Sciences
3. Biological Sciences
4. Social Sciences, Physical
5. Chemical & Mathematical Sciences
6. Climate Change & Environmental Sciences

Social Sciences (**blue**) was the most popular choice for students with 35 projects exhibited, while Technology & Computer Sciences (**yellow**) and Climate Change & Environmental Sciences (**orange**) had the lowest number of participants.



Key Observations:

- The Judging Framework is an independent, clear and transparent process
- The Data Normalisation Algorithm is crucial for cross comparing results and is a proven technique over the previous six years of the exhibition
- The benefit of the two new categories is already apparent, with both containing the highest number of high scoring projects

Key Recommendation:

- YST needs to monitor applications for the lower categories and may need to introduce a quota for the more popular categories.

CONCLUSIONS AND RECOMMENDATIONS

The main focus of YST is the capacity building outreach and mentoring programme. It is evident that this component of the YST programme is very positively received by teachers, students and coordinators. YST provides up-skilling, in-service training for Regional coordinators to help them facilitate workshops with teachers in their respective regions. This In-service training is a key motivator for regional coordinators to be involved in the programme. Furthermore, the regional coordinators consider their role in embedding YST as very important. In return, teachers in the regions reported that their Regional Coordinators played a very supportive role in encouraging their participation in the YST programme.

Recommendation: YST should consider alternative methods of In-Service training for Regional Coordinators for YST2021 if necessary. School visits are considered very important. Where possible YST should aim to complete school visits as previous years.

In 2020, the majority of teachers, students and regional coordinators considered the Online Application process is an easy process. However, a number of teachers found it a difficult process.

Recommendation: YST will analyse the online application difficulties and endeavor to streamline the online application process in 2021.

The majority of participants were satisfied with the processes involved in the screening and selection of projects. This is important as the integrity of the screening process is vital to ensure that participation in YST is seen as a level playing field for all students.

Recommendation: YST should aim to complete the screening process as soon as possible after the deadline of the application.

Students, teachers and regional coordinators were also satisfied with the online judging framework in 2020 and reported the process as a clear and transparent process. This is important as the integrity of the judging process is vital.

Recommendation: YST should provide a summary of results including Judges Comments to Regional Coordinators to disseminate to students and teachers as soon as reasonably possible after the exhibition.

Regional Coordinators responded that they are keen to be involved in the Judging Process.

Recommendations: YST should include a number of the coordinators on future judging panels. This can be incorporated into their In-Service Training and will provide long term benefits to YST, the Coordinators and the teachers and students they support.

It is clear the judging process generates a significant amount of useful data for future analysis. Storage of results for future accessibility may become a challenge for YST. YST should implement a secure storage solution so that all project results are accessible for the future

CONCLUSIONS AND RECOMMENDATIONS

In 2020, the majority of students and teachers were only satisfied with the information they received from YST. However, the majority of Coordinators were very satisfied with this process. As YST tries to disseminate information to teachers and students via regional coordinators there is a need to improve this communication.

Recommendation: YST should ensure increased communication between Regional Coordinators and students via their respective teachers.

The majority of teachers, students and regional coordinators were satisfied with the Online exhibition and Awards Ceremony. However, from the comments received, it is clear some teachers and coordinators would prefer the physical interaction of previous exhibitions.

Recommendation: YST should consider ways to make the online award ceremony more exciting for students and teachers. Also, YST hopes to have the social and physical interaction as in previous years when the situation improves. Other suggestion is a hybrid model combining elements of virtual and physical exhibition.

Participation in YST is reported to have many positive benefits to students, teachers and coordinators.

The Online Award Ceremony met the expectations of all sponsors. Sponsors were particularly impressed by the digital award ceremony, digital project presentations and sponsor video presentations at the awards ceremony and they reported that YST had succeeded beyond expectations considering the challenges posed by COVID-19.

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LAUNCH #YST2020
January

Online Outreach

Applications Close
March

Shortlisting

Judging
June

Online Award Ceremony
August

Online Exhibition
August

6 CATEGORIES



28 AWARDS



4



31 REGIONS

604 PROJECT SUBMISSIONS

123 PROJECTS



3

177 TEACHERS



2416+ STUDENTS

340,000 VIEWERS WATCHED

1 WINNER



Glory Joseph and Martha Machumu
from
Nganza Girls Secondary School
Mwanza

6

5

28 JUDGES

6 Countries

Many cups of coffee





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