

Setswana

# Dintlha-kgolo tsa Dikamano tša Setšhaba tša Aforika Borwa le Saense: Dipholo tša Patlisiso ya 2022



science, technology  
& innovation

Department:  
Science, Technology and Innovation  
REPUBLIC OF SOUTH AFRICA



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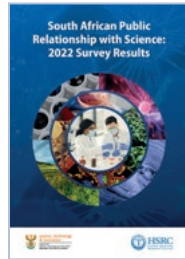
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**E dirilwe ke Human Sciences Research Council (HSRC) mo boemong jwa Department of Science and Innovation (DSI).**

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**Go nopola pegu eno:**

Lefapha la Saense le Tlhabololo (2024) Dintlha-kgolo tsa Dikamano tsa Setšhaba tsa Aforika Borwa le Saense: Dipholo tsa Patlisiso ya 2022. E rulagantswe ke Human Sciences Research Council ya Lefapha la Saense le Tlhabololo. Pretoria: HSRC.



**Pegu eno ya dintlha tsa konokono e theilwe mo pegong e e feletseng:**

Lefapha la Saense le Tlhabololo (2024) Botsalano jwa Setšhaba sa Aforika Borwa le Saense: Dipholo tsa Patlisiso ya 2022. E rulagantswe ke Human Sciences Research Council ya Lefapha la Saense le Tlhabololo. Pretoria: HSRC

Komiti ya Boitsholo Protocol Number REC/Renewal to Protocol No REC 5/17/08/11: South African Social Attitudes Survey (SASAS) 2019.

The South African Public Relations with Science (SAPRS): 2022 Survey Results ke konelo ya dingwaga tse di fetang nne tsa tiro e e akaretsang go tlhama thuto, go tlhama didiriswa, go kgobokanya tshedimosetso, go sekaseka tshedimosetso le go kwala pegu.

E ne e le tirisanommogo magareng ga Yuniti ya Tsweletso ya Saense kwa Lefapheng la Saense le Tlhabololo le Lenaneo la Patlisiso la Thuto e e Tshwanelang le Ikonomi (EEE) kwa Khanseleng ya Patlisiso ya Saense ya Batho. Setlhophu sa DSI se ne se eteletswe pele ke Rre Isaac Ramovha mme setlhophu sa patlisiso sa HSRC se ne se eteletswe pele ke Dr Vijay Reddy.

Mo dingwageng tse nnè tse di fetileng, maloko a magolo a setlhophu sa patlisiso e ne e le Dr Vijay Reddy, Dr Benjamin Roberts, Mme Sylvia Hannan le Dr Steven Gordon.



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# 1 Matseno

Kitso ya saense e oketsa tsela e re tlhologanyang lefatshe ka yone, e re tlhologanyang ka yone le e re tlhologanyang go nna gone ga rona ka yone. Go na le tumalano e e anameng ya gore maikaelelo a saense a tshwanetse go fetela ka kwa ga ditlamorago tsa ikonomi le tsa thekenoloji, go rarabolola dikgwetlho tsa segompiano tsa lefatshe le tsa selegae tse di amang matshelo a rona ka tlhamalalo. Go tloga mo malatsing a yona a ntlha, puso ya temokerasi ya Aforika Borwa e lemogile botlhokwa jwa kamano magareng ga setšhaba le saense, le gore maAforika Borwa otlhe a tshwanetse go nna le seabe mo tlabolong ya National System of Innovation (NSI).

Lefapha la Saense le Tlabololo, mmogo le balekane ba lona, le na le maikarabelo a go rotloetsa go nna le seabe ga saense mo NSI. Buka ya bosheng ya White Paper on Science, Technology and Innovation (STI) e ikaegile ka maiteko a a fetileng ka go buelela setšhaba se se itseng go bala le go kwala ka tsa saense, mmogo le go tsepamisa mogopolo gape mo go amaneng ga saense le setšhaba (DST 2019a). Go sekaseka kgatelopele e e dirilweng go fitlhelela setšhaba se se batlang go itse saense le go e lemoga, DSI e ne ya simolola ka go tlhoma setlhopho sa dikaedi go lekanya bokgoni jwa go nna le seabe mo go tsa saense mo tsamaisong yotlhe. Sa bobedi, e ne ya amogela setlhopho sa di-sub-indicators go tlamela patlisiso ya gangwe le gape ya setšhaba sa bagolo sa Aforika Borwa go lekanya le go lekola maemo a kitso ya saense, maikutlo, le go nna le seabe.

Mananeo a go nna le seabe mo go tsa saense le go lekanya kamano magareng ga setšhaba le saense a ne a tsenngwa mo ditheong tsa semolao ka dipholisi le maano a le mmalwa, e leng Leano la go Nna le Seabe mo go Tsa Saense (DST,

2015), Pampiri e Tshweu ya Saense, Thekenoloji le Boitshomoleledi (DST, 2019a), Letlhomiso la Tlhokomelo le Tlhatlhubo ya go Nna le Seabe mo go Tsa Saense (DST, 2019b), mmogo le Letlhomiso la go Nna le Seabe mo go Tsa Saense (DST, 2021).

Patlisiso ya ntlha e e akaretsang e e neng e lebagane le go lekanya le go lekola maemo a kitso ya saense, maikutlo le go nna le seabe ga batho e ne ya dirwa ka 2022. Patlisiso eno e tla dirwa gape morago ga dingwaga dingwe le dingwe di le tlhano. Pego e e akaretsang – [The South African Public Relations with Science Survey: 2022 Results \(DSI, 2024\)](#) – e phasaladitswe. Pego eno e tlhalosa ka bokhutshwane mokgwa wa go dira dipatlisiso mmogo le go sekaseka le go sekaseka diphelelo tsa go nna le seabe mo go tsa saense (SEMEIIF) e e neng ya thusa go tlhama kitso ya saense e le 27, mekgwa le dikgato tsa go nna le seabe mo go tsa saense. Go tswa foo, re sobokanya diphelelo tsa konokono ka go tlhalosa maemo (dipalo tse di tlwaelegileng) mo ditekanyetsong tse di farologaneng, mmogo le go farologana ga dipalo mo tekanyetsong nngwe le nngwe. Go tswa foo, re bega gore ke dinonfo dife tsa loago le tsa batho tse di neng di ka nna tsa dira gore batho ba nne le kitso e e siameng ka saense, ba nne le boikutlo jo bo siameng ka yone le go nna le seabe mo go yone.

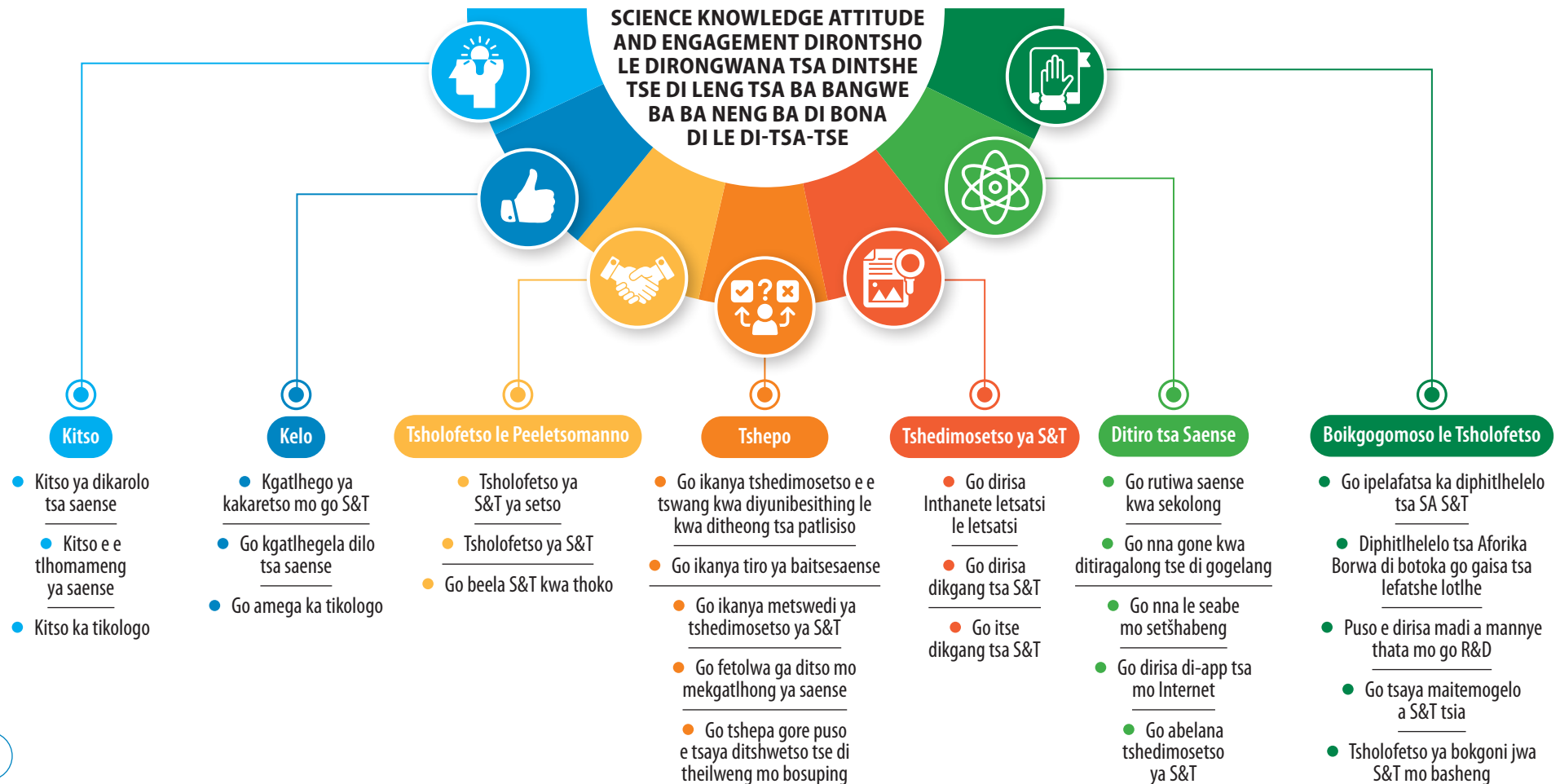
Go tswa foo re bontsha kafa setšhaba sa Aforika Borwa se amanang ka teng le saense ka go dirisa palogare ya maduo le dipharologano mo go nngwe le nngwe ya dikgato tse 27 tsa saense. Go tswa foo, dikgato tseno di kgaogangwa ka ditlhopho di le nnè go ya ka palogare ya tsone le go farologana ga tsone. Re konela ka go sobokanya dipolelo le dikakantsho.

## 2 Mokgwa wa go ithuta

<b>Sekao/Batho</b>	Sekao se se emelang setšhaba sa bagolo ba dingwaga di le 16 le go feta, se se tlhophilweng mo mafelong ale 500 go ralala diporofense di le robongwe.
<b>Selekanyo sa batho ba ba tlhophilweng</b>	5 960 ba ba neng ba araba mo selekanyong sa setšhaba.
<b>Sediriswa sa patlisiso le letlhomeso la go bega</b>	Sediriswa sa patlisiso le letlhomeso la go bega: Letlhomeso la Tlhokomelo le Tlhatlhobo ya Seabe sa Saense le ne la tlamela ka tlabololo ya sediriswa sa patlisiso jaaka mmogo le tselo e pego e rulagantsweng ka yone.
<b>Dipotsolotso tsa patlisiso</b>	Fa gare ga Ngwanatsele 2022 le Ferikgong 2023, go ne ga dirwa dipotsolotso tsa diura di le 16 le go feta le bagolo ba ba nang le dingwaga di le 16 le go feta. Dipotsolotso di ne tsa dirwa ka nngwe ya dipuo di le 11 tsa semmuso, go ikaegilwe ka gore batho ba ba botsoloditsweng ba rata eng.
<b>Go tsaya tshedimosetso</b>	Go dirisiwa mokgwa wa go botsolotso motheo ka khomputara (CAPI), tshedimosetso e ne ya tsenngwa mo sedirisiweng sa motheo se se dirisiwang go tsaya tshedimosetso (PDA).
<b>Go lekalekanya tshedimosetso</b>	Dintlha tsotlhe di ne di lekantswe go ya ka palo ya batho ba ba nang le dingwaga di le 16 le go feta.
<b>Go begwa ga dipholo</b>	Dipholo tse di botlhokwa go ya ka dipalopalo di begwa mo maemong a go tshepa a 95%.
<b>Go ne ga dirisiwa dilo tse di farologaneng tsa loago le tsa batho</b>	Dingwaga, bong, maemo a thuto, go tshegetsatsa thuto ya kwa gae e e neelwang ke batsadi le bagolo ba bangwe (go tshegetsatsa go bala, tiro ya sekolo e e direlwang kwa gae, jalo le jalo), maemo a loago le a ikonomi a a theilweng mo tshupetsong ya dithoto, maemo a mo mmarakeng wa badiri, lefelo le motheo a nnang mo go lone, ditumelo tsa bodumedi le setlhopho sa batho. Re di bitsa ditlhopho tse dinnye.
<b>Lereo 'science' le kaya</b>	Tlhagiso ya kitso mo dikgaolong tsa thuto: tsa tlhago le tsa botshelo, boenjeneri, tsa loago le tsa botho.
<b>Lereo "public" le le nosi e bile le le mantsi</b>	Go na le "publics" di le dintsi mo Aforika Borwa go ikaegilwe ka tlhago e e farologaneng ya setšhaba. Ka jalo, lereo "batho botlhe" le akaretsa batho ba ba farologaneng le ba ba farologaneng.
<b>Re dirisa tshedimosetso e e begilweng ke batho ka bobone</b>	Tshedimosetso eno e ne ya kokoanngwa ka go dirisa dipotso tsa patlisiso tse mo go tsone batho ba ba neng ba le mo patlisisong eno ba neng ba ntsha dikarabo tsa bone ka bobone ntle le go tlhatlhabiwa ke batho ba bangwe.
<b>Palogare ya dipalo</b>	Dipalo tsa dilo tse di agilweng ka selo se le sengwe le tse di agilweng ka dilo di le dintsi di ne tsa fetolelwa go sekale sa 0-100. Go ne ga balwa palogare ya maduo mme ga begwa palogotlhe ya a le 100.
<b>Go farologana ga maduo</b>	Pharologano e e fa gare ga maduo a a kwa godimo le a a kwa tlase a palogare, go ya ka ditlhopho tse dinnye.

# 3 Letlhomiso la Tlhokomelo le Tlhatlhubo ya Tshwaelo ya go Tsaya Karolo mo Saenseng

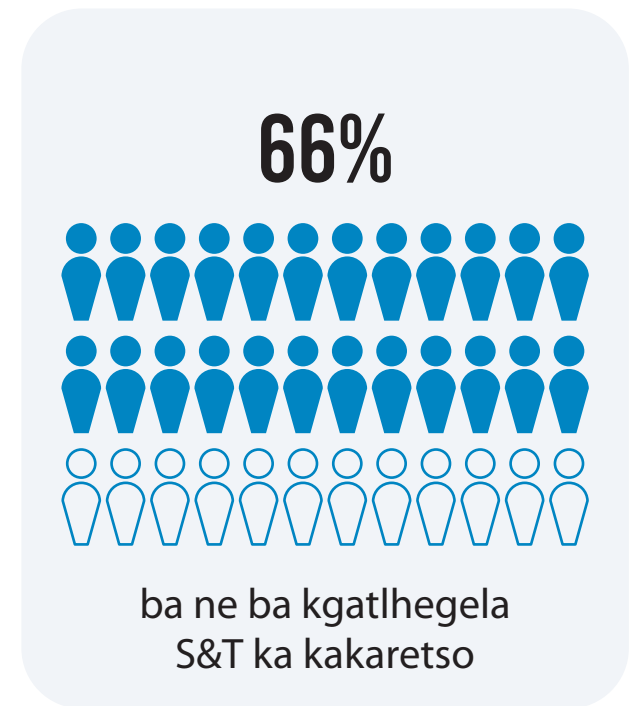
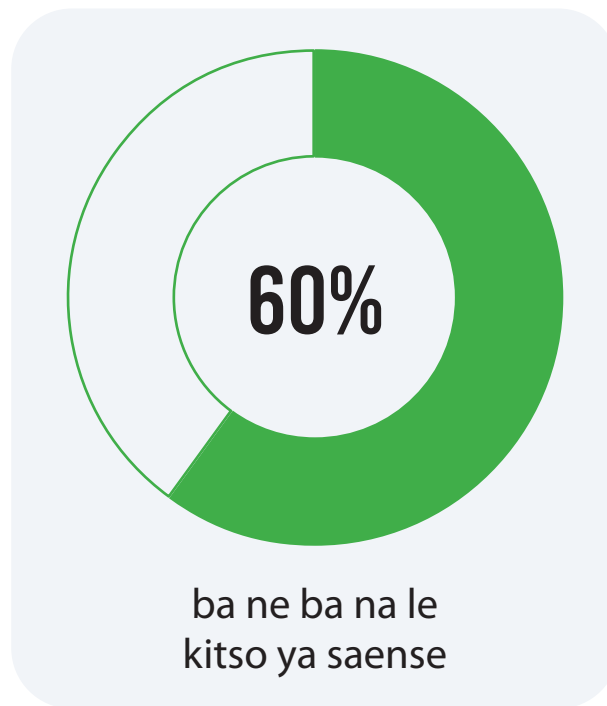
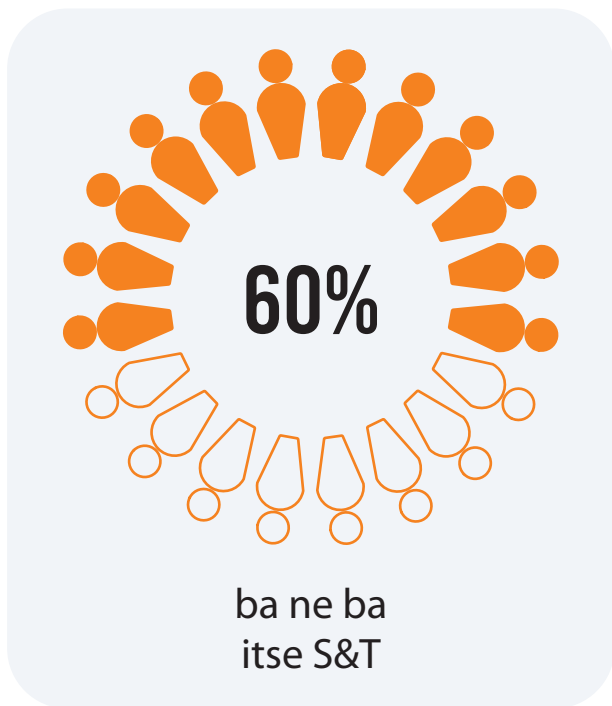
SEMEIIF e ne ya tlabololwa go sekae go akaretsa dipontsho di le supa kgotsa ditlhogo tsa ditlamorago le dipontsho-potlana di le 27 kgotsa dikgato tsa ditlamorago. Ditshupo e ne e le kitso ya saense le thekenoloji (S&T) le kgatlhego; tsholofetso le go nna le maikutlo a go se ikanye le go ikanya; tshedimisetso ya saense le thekenoloji; le diphelelo tsa go nna le seabe mo go tsa saense, go akaretsa le maikutlo a a amanang le boikgantsho le tsholofetso ya saense le thekenoloji. Gore re kgone go lekanya le go dirisa sesupo sengwe le sengwe kgotsa setlhogo sengwe le sengwe se se amanang le diphelelo tsa sone, re ne ra tlhopha dikgato di le tharo go ya go di le tlhano tse di amanang le diphelelo tsa sone. Mo dikarolong tse di latelang, re tla bega ka diphelelo tsa konokono tsa kgato nngwe le nngwe ya go sekaseka diphelelo. Go bona dintlha tse di oketsegileng ka ga dipholo, tsweetswee leba **pego ya konokono**.



# 4 Kitso ya setšhaba le kitso le kgatlhego mo go tsa saense le thekenoloji

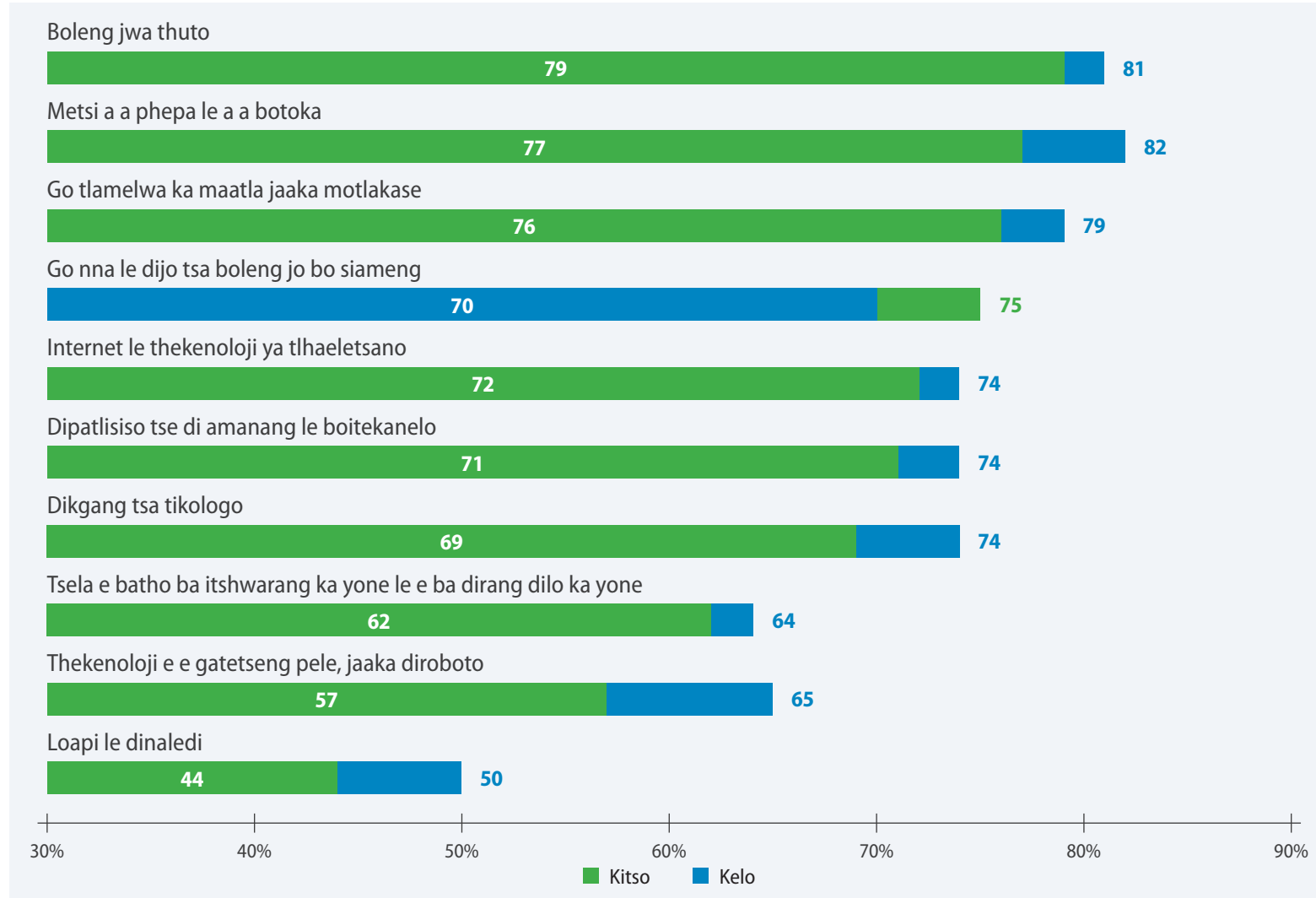
Go itse le go kgatlhegela S&T go re naya lesedi ka kamano e e leng teng magareng ga setšhaba le saense. Fa re re kgatlhego, re raya go batla go itse mo go oketsegileng, kitso e kaya tshedimosetso e motho a setseng a na le yone, fa temogo yone e kaya go itse sengwe, le fa gone go sa reye gore o a se tshaloganya.

Setšhaba se ne sa araba ka go farologana malebana le gore ba kgatlhegela S&T go le kana kang, ba na le kitso e kana kang le gore ba itse go le kana kang ka yone. Ka kakaretso, Maaforika Borwa a itse, a na le kitso e bile a kgatlhegela S&T.



## 4.1 Peresente ya bagolo ba ba nang le kitso e e rileng le kgatlhego mo dikarolong tsa saense tse di botlhokwa

Mo godimo ga moo, re ne ra batlisisa kitso le kgatlhego ya setšhaba ka ga dikgwetlho tsa segompieno tsa loago tse di tlhokang go tsibogela S&T.



**KWA TLOGONG E KGOLO YA KITSO**  
Boleng jwa thuto

**79%**

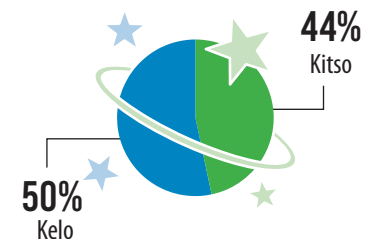


**KGOLOGOLO YA GO ITSEBA**  
Metsi a a phepa le a a botoka

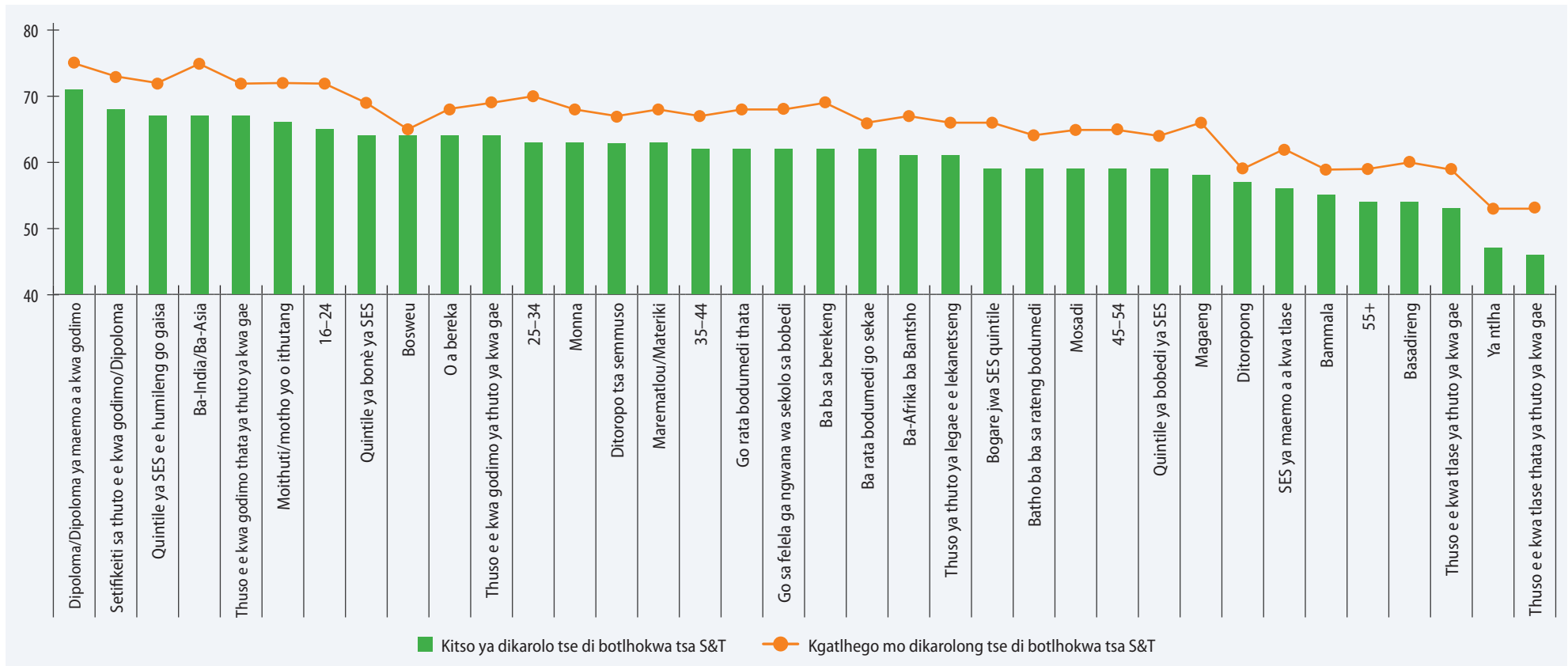
**82%**



**DITEKANYO TSE DIKGOLO TSA BOITEKANYO LE GO KGATLHEGELA**  
Lefaufau le dinaledi



## 4.2 Palogare ya maduo a kitso le kgatlhego mo go S&T, e e tlhagisitsweng mo ditlhopheng tse di farologaneng



### Ke mang yo o neng a na le kitso e e kwa godimo le go kgatlhegela S&T?

Go ne go na le pharologano e kgolo ya maduo mo ditlhopheng tse dinnye, ka palogare ya maduo a kitso ya saense a ne a tloga go 46 go ya go 71 mo go tse 100, le a go kgatlhegela saense go tloga go 53 go ya go 75 mo go tse 100.

### Ba ba nang le kitso e e kwa godimo ya saense le kgatlhego:

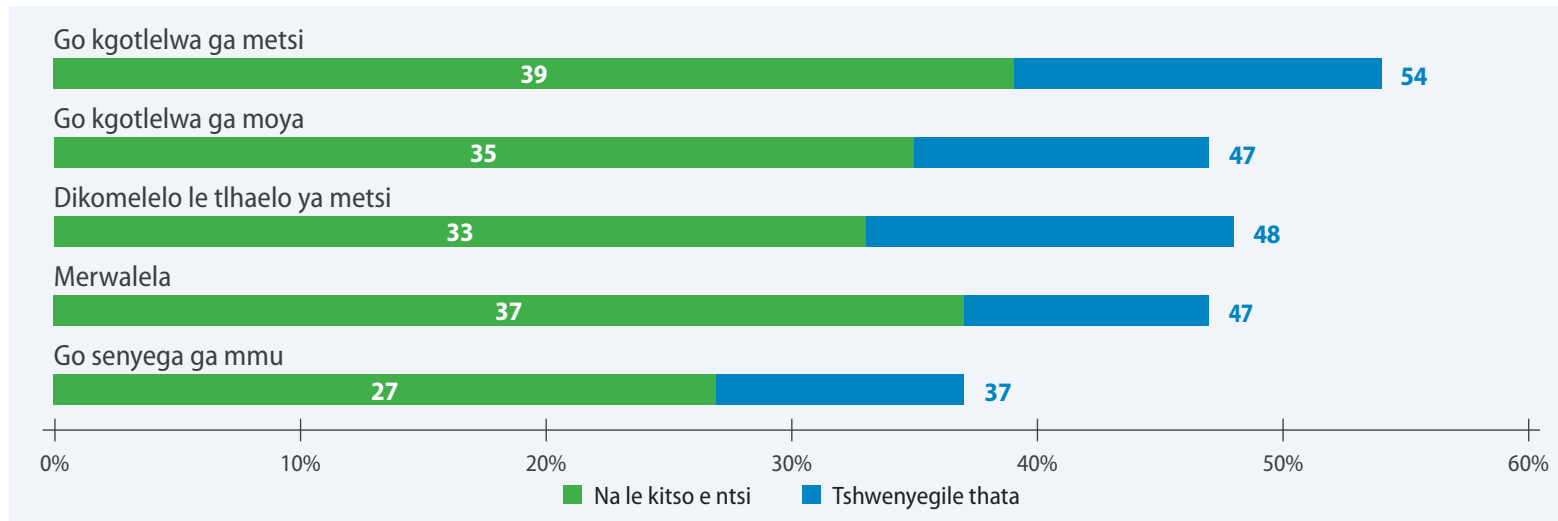
- ba ne ba le banye,
- na le thuto ya morago ga sekolo se segolwane,
- ba ne ba amogetse thuso ya thuto e e kwa godimo kwa gae, le
- ba ne ba tswa mo malapeng a a nang le maemo a a kwa godimo a itsholelo (SES).

Batho ba bagolo ba basweu le ba India/Asia ba ne ba na le kitso e e kwa godimo ya S&T; fa batho ba bagolo ba basweu, ba bantsho ba Aforika le ba India/Asia ba ne ba na le kgatlhego e e kwa godimo.

# 5 Kitso ya setšhaba le go amega ka ditiragalo tsa tikologo

Ditlamorago tsa phetogo ya tlelaemete le ditiragalo tse di sa itumediseng tsa tikologo ke matshwenyego a lefatshe le a Aforika Borwa. Batho ba le bantsi ba ba godileng ba ne ba re ba “tshwenyegile thata” ka ditiragalo tseno tsa tikologo go na le go re ba “itse thata” ka tsone.

## Peresente ya bagolo ba ba neng ba na le “kitso e ntsi” le “go tshwenyega thata” ka ditiragalo tsa tikologo



Bagolo ba le 3 mo go ba le 4

ba ne ba na le kitso e e rileng e bile ba tshwenyegile ka ditiragalo tsa tikologo



**GO ITSE MO GO GOLOGOLO GORE GO NA LE GO TLOGELA**

Ditiragalo tsa tikologo

**47%**  
Matshwenyego

**34%**  
Kitso



## Dikarolo tsa batho ba ba nang le kitso e e kwa godimo le go amega ka ditiragalo tsa tikologo

- Palogare ya maduo, go ya ka ditlhopha tse dinnye, e ne e le magareng ga 56 le 74 (mo go tse 100) mo kitsong ya tikologo, le magareng ga 62 le 83 mo go tshwenyegeng ka tikologo.
- Bagolo ba ba neng ba na le kitso e ntsi e bile ba amegile thata ka ditiragalo tsa tikologo:
  - o ne a na le thuto ya morago ga sekolo se segolwane, mme a na le maitemogelo a thuto e e kwa godimo ya kwa gae,
  - ba ne ba tswa mo malapeng a a humileng a SES, le
  - o ne a nna mo ditoropong mo mafelong a a tlwaelegileng le a kwa magaeng.
- Batho ba bagolo ba basweu le ba Baintia/Ba-Asia ba ne ba na le kitso e e kwa godimo ka ditiragalo tsa tikologo fa batho ba bagolo ba Basweu, Ba-Afrika ba Bantsho le Baintia/Ba-Asia bone ba ne ba tshwenyegile thata ka ditiragalo tsa tikologo.

# 6

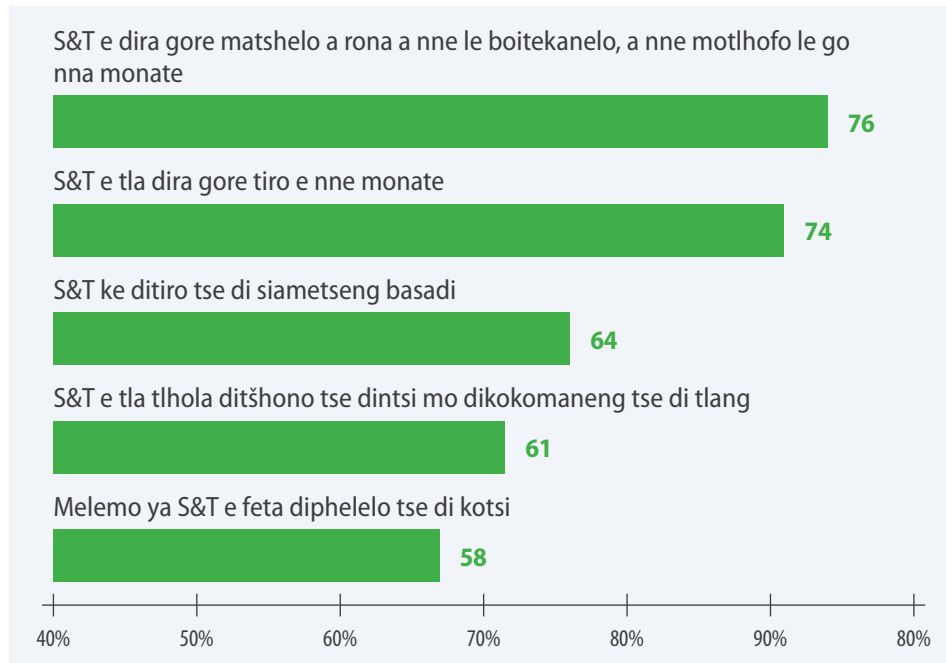
## Go solofetsa le go nna le maikutlo a go nna le dithibelo malebana le S&T ya segompiano le ya setso

Batho ba ne ba araba ditlhopho tsa dipotso tse di neng di ba botsa gore ba ikutlwa jang ka dilo tse ba di solofeditsweng (dipoelo tse di ka nnang teng) le tse ba di belaelang (dipoifo le dikotsi) tse di amanang le saense ya segompiano le ya setso. Setšhaba sa Aforika Borwa se lemogile ditsholofetso le matshwenyego a S&T.

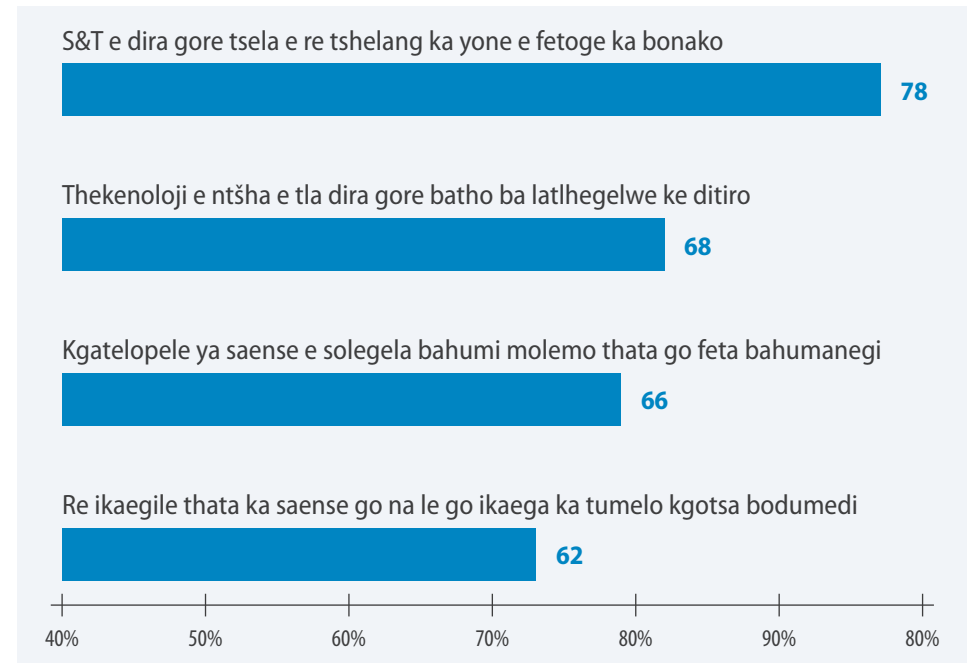
### 6.1 Tsholofelo le go nna le dipelaelo ka S&T ya segompiano

Melemo e megolo e e ka nnang teng e e begilweng e ne e amana le S&T e e dirang gore botshelo jwa letsatsi le letsatsi bo nne le boitekanelo, bo nne motlhofo, bo nne monate le go dira gore tiro e nne e e kгатhang; fa tlhobaelo e kgolo e e neng ya lemogiwa e ne e le ka ga S&T e e dirang gore tsela ya rona ya botshelo e fetoge ka bonako le go oketsa go tlhoka tekatekano.

#### Tsholofetso ya saense ya segompiano (% ya tumalano)



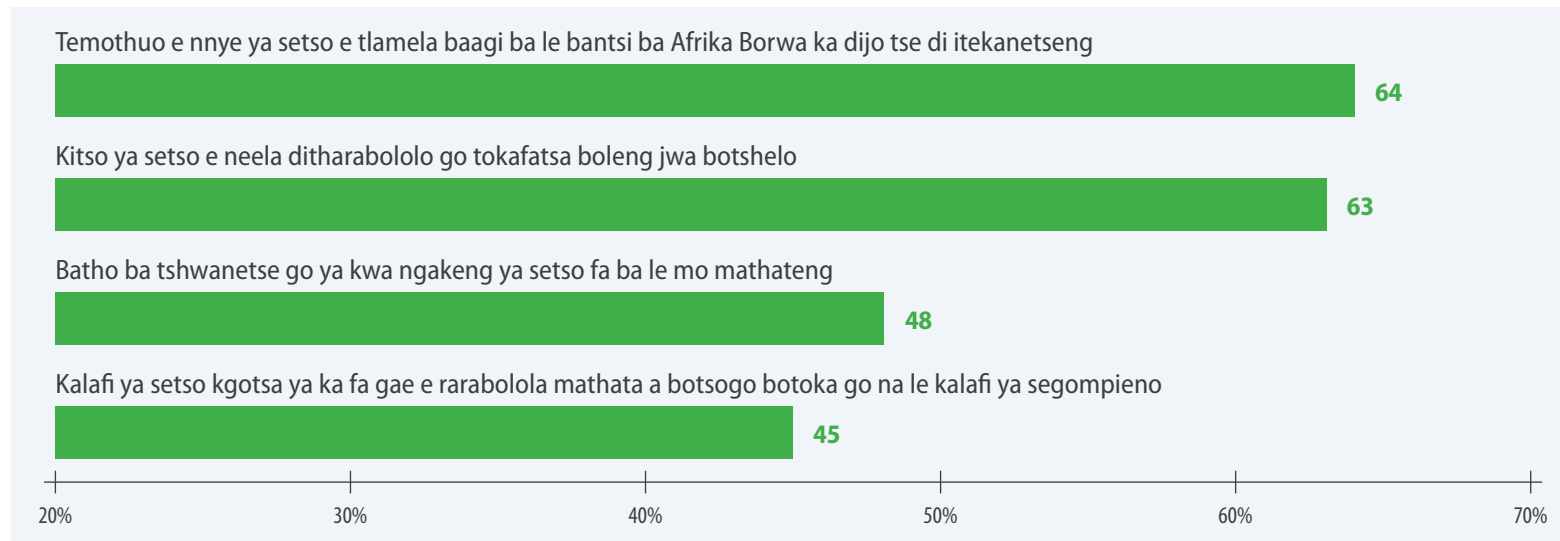
#### Go sa dumalane ka saense ya segompiano (% ya tumalano)



## 6.2 Go solofetsa le go nna le maikutlo a go nna le dithibelo malebana le S&T ya setso

Saense ya setso e kaya kitso le bokgoni tse di ileng tsa fetisediwa go tswa kokomaneng e nngwe go ya go e nngwe mo setšhabeng.

### Tsholofetso ya saense ya setso (% tumalano)



**Bagolo ba le 2  
mo go ba le 3**

ba lemogile melemo ya temothuo e nnye ya setso le kitso ya setso mo go tlhagiseng dijo

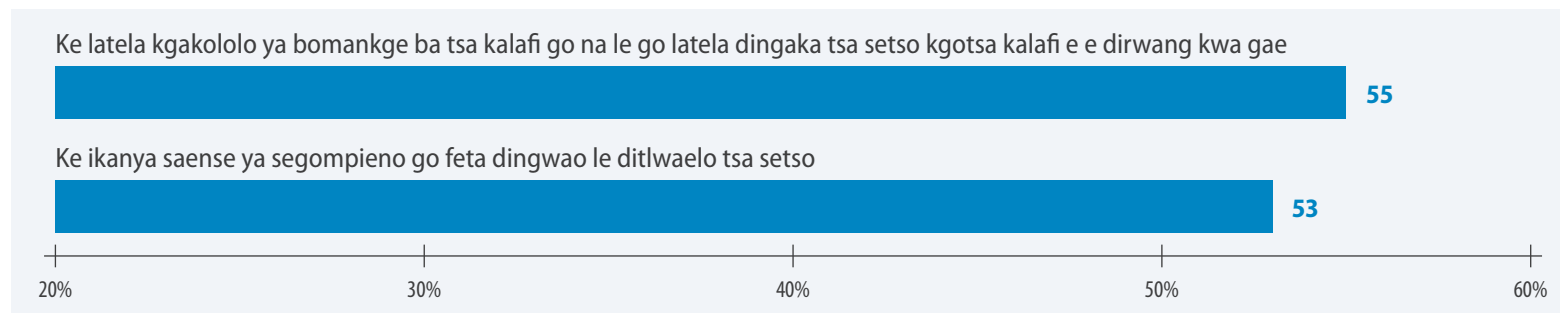


**Bagolo ba le 5  
mo go ba le 10**

ba lemogile seabe sa dingaka tsa setso le kalafi ya setso

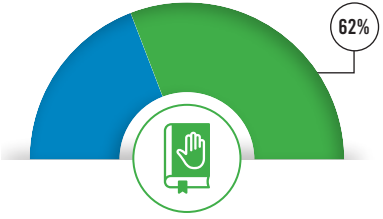

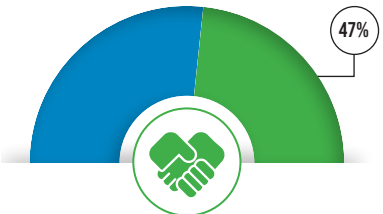


### Go nna le dipelaelo ka ga saense ya setso ka 2022 (% tumalano)



## 6.3 Tsela e batho ba ba solofetsang le ba ba sa solofeleng ba neng ba kgaogantswe ka yone le gore ke bomang ba ba neng ba na le tsholofelo le ba ba sa solofeleng

Go ne go na le ditsholofetso tse di kwa godimo le go nna le boikutlo jwa go ikogona malebana le saense ya segompieno go na le malebana le saense ya bogologolo. Mo godimo ga moo, go ne go na le pharologano e potlana fa gare ga maitsholo a batho a go solofetsa le a go beela dilo nako e e tlang (jaaka go bontshiwa ke pharologano fa gare ga maduo a a kwa godimo le a a kwa tlase go ya ka ditlhopho tse dinnye) fa go tliwa mo saenseng ya segompieno go na le mo saenseng ya setso.









	Peresente ya bagolo ba ba nang le maikutlo a a nonofileng	E e kwa godimo le e e kwa tlase maduo (le pharologano)	Ke bomang ba ba neng ba na le tshono e ntsi ya go bega gore ba solofetse go le gontsi e bile ba na le boikutlo jwa go ikogona?
Tsholofatso ya saense ya segompieno		62 to 72 = 10 points	Bagolo ba ba nang le thuto e e fetang ya poraemari, thuto e e kwa godimo ya kwa gae Baithuti ba ba neng ba ithuta ba ne ba na le maikutlo a a kwa godimo tsholofetso.
Go nna kgatlanong le saense ya segompieno		64 to 76 = 12 points	Bagolo ba ba nang le thuto e e fetang ya poraemari, thuto e e kwa godimo ya kwa gae Go ne go na le batho ba ba neng ba na le dingwaga tse di kwa tlase ga tsa bone ba ba neng ba na le dingwaga tse di kwa tlase ga tsa bone, le batho ba bagolo ba bantsho ba kwa Afrika le ba kwa India/Asia ba ba neng ba na le dingwaga tse di kwa tlase ga tsa bone. boikutlo jo bo kwa godimo jwa go ikogona.
Tsholofetso e e malebana le saense ya setso		49 to 70 = 21 points	Bagolo ba ba sa rutegang thata, ba ba tswang mo malapeng a a humanegileng, Batho ba bagolo ba bantsho ba Afrika le ba ba neng ba bua Tshivenda, isiZulu, le Xitsonga S&T ya setso e ne ya bega tsholofetso e kgolwane.

## 6.4 Tsela e batho ba neng ba itshwara ka yone fa nako e ntse e tsamaya malebana le go solofetsa le go se solofetse



Mo dintlheng tse di neng di akareditswe mo dipatlisisong tse di fetileng, re ne ra bapisa dipholo le patlisiso ya SAPRS 2022. Ka kakaretso, diphelelo di bontshitse go oketsega ga go solofetsa le go nna le maikutlo a go ikogona fa nako e ntse e tsamaya malebana le saense ya segompiano, mme go fokotsega ga go solofetsa le go nna le maikutlo a go ikogona malebana le saense ya setso.

Phetogo e kgolo e ne e le tsela e batho ba lebang go oketsega ga go sa lekalekane ka yone, mme dikarabo tsa polelo e e reng “Kgatelopele ya saense e solegela bahumi molemo go feta bahumanegi” di ne tsa oketsega ka diperesente di le 17. Go ne ga nna le go fokotsega go go bonalang ga palo ya batho ba ba neng ba dumela gore S&T e tla dira gore dikokomana tse di tlang di nne le ditshono tse dintsi. Le fa go itumedisa go lemoga gore bontsi jwa batho jaanong ba tshepa saense ya segompiano le ditlwaelo tsa setso le setso, go na le tlhobaelo ya gore tsela e batho ba akanyang ka yone e ka nna ya se ka ya tokafala. Go lemogiwa ga ditsholofetso tsa temothuo e potlana go fokotsegile.

NB: Diteng tse di nang le mmala o motala di begile koketsego e e bonalang ya dipono go tloga ka 2013 go fitlha ka 2022, tse di nang le mmala o o serolwana ga di a ka tsa nna le diphetogo tse di bonalang, fa tse di nang le mmala wa namune tsone di begile go fokotsega go go bonalang ga dipono.

Saense ya segompiano: Phetogo go tloga ka 2013 go fitlha ka 2022 (Palo ya diperesente)		
Kgatelopele ya saense e solegela bahumi molemo go feta bahumanegi (R)		+17***
Re ikaegile thata ka saense mme ga re ikaege thata ka tumelo kgotsa bodumedi (R)		+7***
S&T e dira gore tsela e re tshelang ka yone e fetoge ka bonako thata (R)		+5***
Melemo ya S&T e feta diphelelo tse di kotsi (P)		+9***
S&T e tla dira gore tiro e nne monate (P)		+7***
S&T e dira gore matshelo a rona a nne a a itekanetseng, a nne motlhofo le go nna monate (P)		0
S&T ke ditiro tse di siametseng basadi (P)		-2
S&T e tla tlhola ditshono tse dintsi mo dikokomaneng tse di tlang (P)		-11***

Dintlha: \*\*\* e botlhokwa go ya ka dipalopalo fa  $p < .001$

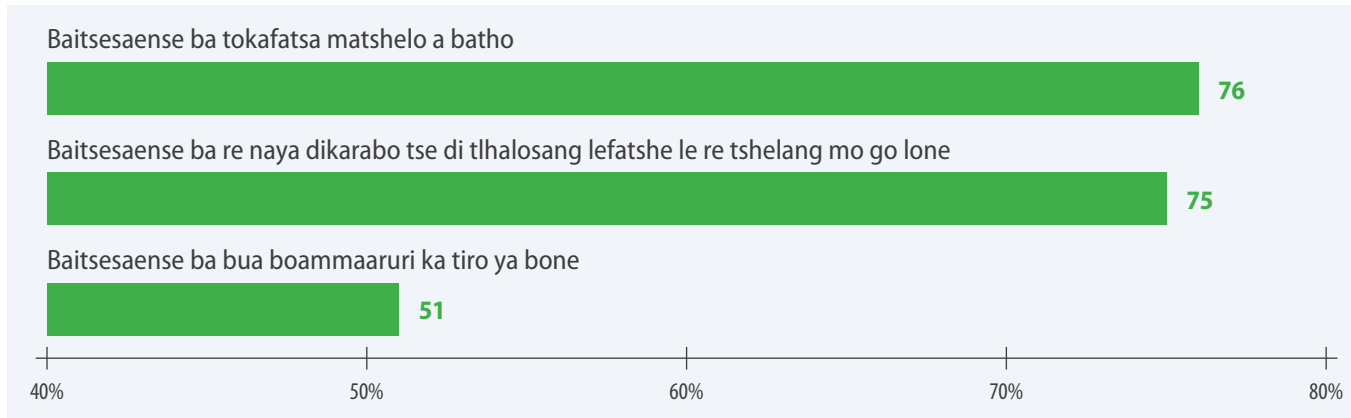
Saense ya setso: Phetogo go tloga ka 2009 go fitlha ka 2022 (Palo ya diperesente)		
Temothuo e nnye ya setso e tlamela Maaforika Borwa ka dijo tse di itekanetseng (P)		-7***
Ke ikanya saense ya segompiano go feta dingwao le ditlwaelo tsa setso (R)		-18***

Dintlha: \*\*\* e botlhokwa go ya ka dipalopalo fa  $p < .001$

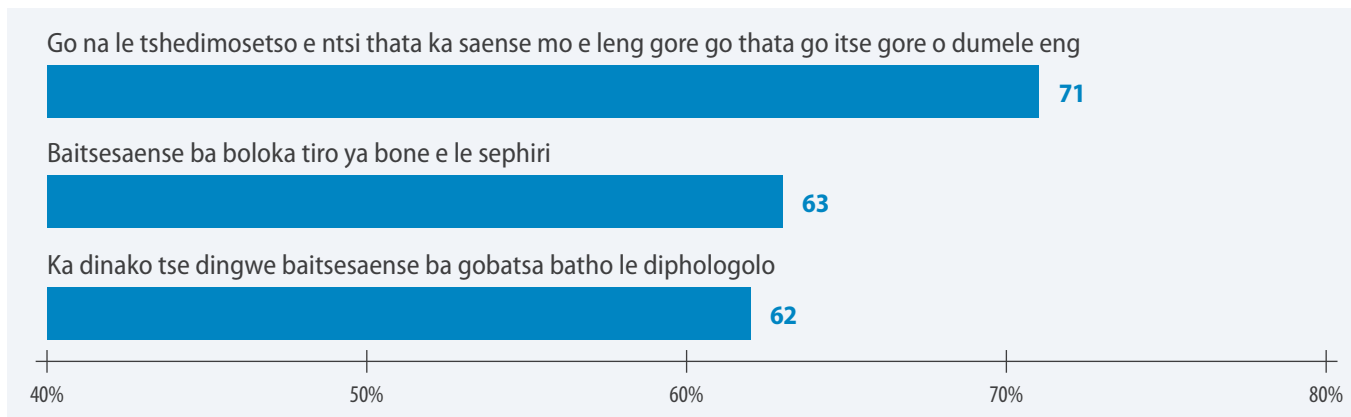
# 7

## Go tshepa tiro ya borasaense le tshedimisetso ya saense e e tswang kwa ditheong

### Tsholofetso ya tiro ya borasaense (% tumalano)



### Go sa dumalane ka tiro ya borasaense (% tumalano)



Saense le baitseane ba re naya tshedimisetso e e theilweng mo bosuping le kgakololo ya gore re ka rarabolola jang mathata a setšhaba. Gore batho ba amogele kgakololo eo, ba tshwanetse go ikanya saense le baitseane, mmogo le go ikanya ditheo tse di dirang gore go nne le kitso eo.

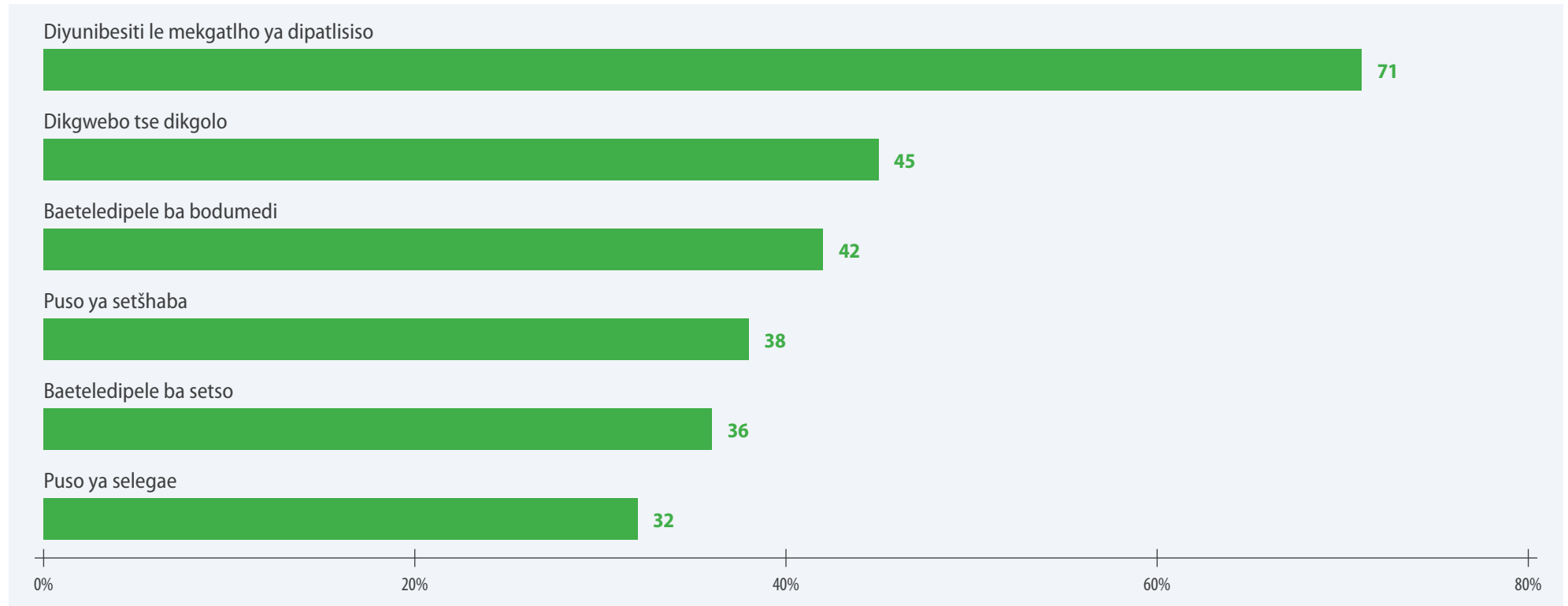


**Bagolo ba le 7 mo go ba le 10**

**ba ne ba tshepa tiro ya baitseane, mmogo le tshedimisetso ya S&T e e tswang kwa diyunibesithing le kwa ditheong tsa patlisiso**

Le fa go ntse jalo, ka nako e e tshwanang, palo e e kwa godimo ya batho e ne e na le dipelaelo ka tiro ya baitseane e bile ba sa tshepe thata tshedimisetso ya S&T e e tswang mo baeteledipeleng ba bodumedi le mo ditheong tsa puso (bona tsebe e e latelang).

## Go tshepa tshedimosetso ya S&T go tswa kwa ditheong tse di farologaneng (% tumalano)



### Ke mang yo o neng a tshepa thata baitsesaense le tshedimosetso ya S&T go tswa kwa diyunibesithing le kwa ditheong tsa dipatlisiso?

Batho ba ne ba na le maikutlo a a tshwanang, go sa kgathalesege gore ba farologane go le kana kang mo go tsa loago le tsa palo ya batho, malebana le go ikanya tiro ya borasaense le go ikanya tshedimosetso ya S&T e e tswang kwa diyunibesithing le kwa ditheong tsa patlisiso.

Ba ba neng ba tshepa thata borasaense le tshedimosetso ya S&T go tswa kwa diyunibesithing le kwa ditheong tsa patlisiso e ne e le:

- bagolo ba ba nang le thutego e e kwa godimo,
- bagolo ba ba amogelang thuso ya thuto e e kwa godimo kwa gae,
- ba ba sa leng basha, le
- baithuti le ba ba ithutang.

# 8

## Go tshepa puso mo go tseyeng ditshwetso ga puso le go fetoga ga dingwao mo ditheong tsa saense

Go tshepa dithulaganyo tsa puso tse di theilweng mo bosuping (E) le tse di tsayang ditshwetso ka go nna le seabe (PP) (% ya go dumalana le go sa dumalane)

Puso e akanyetsa maikutlo a setšhaba fa e dira ditshwetso tse di botlhokwa (PP)



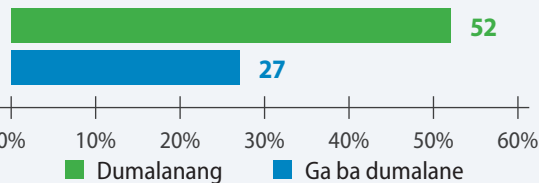
Puso e kopana le setšhaba go buisana ka ditshwetso tsa botlhokwa (PP)



Puso e dirisa diphelelo tsa dipatlisiso go dira ditshwetso tse di siameng (E)



Puso e tsaya tshedimosetso e e tswang mo ditlhopheng tsa baitseanape tsia fa e dira ditshwetso (E)



Mekgwa ya go dira dilo mo ditheong tsa saense e a fetoga (palo ya batho ba ba dumalanang)

Mekgatlho ya saense e tshagisa kitso e e maleba ka ga botshelo jwa letsatsi le letsatsi mo Aforika Borwa



Baitseanape ba emela ditlhopho tsothe tsa merafe mo Afrika Borwa



Basadi ba le bantsi ba dira ditiro tsa saense



Mekgatlho ya saense e akaretsa kitso ya setso mo tirong ya bone



Mekgatlho ya saense e reetsa batho pele ga e dira ditshwetso ya gore e tshwanetse go dira dipatlisiso dife



Bagolo ba le 3 mo go ba le 10

ba ne ba re ba tshepa thata dithulaganyo tsa puso tsa go dira ditshwetso



Bagolo ba le 4 mo go ba le 10

ba ne ba dumela gore ditso mo ditheong tsa saense di a fetoga

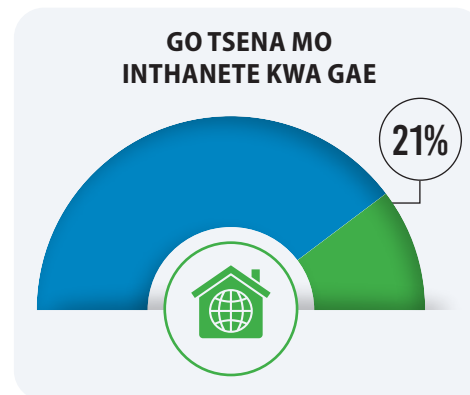
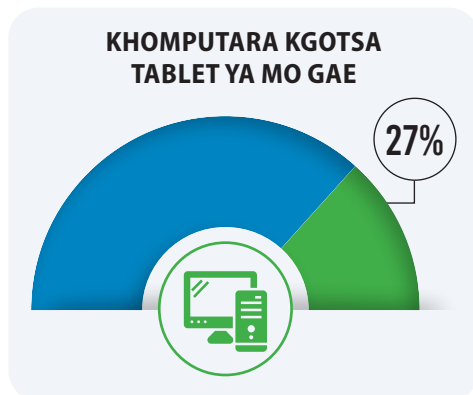
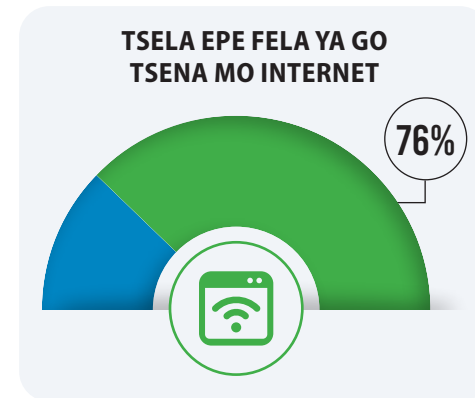
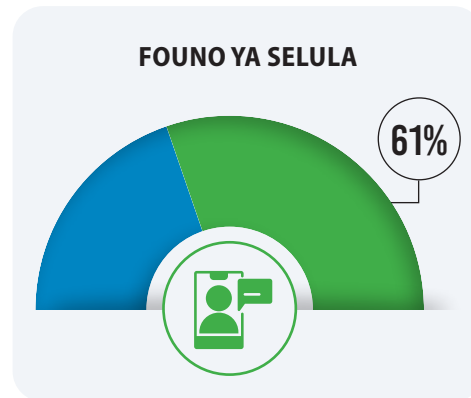
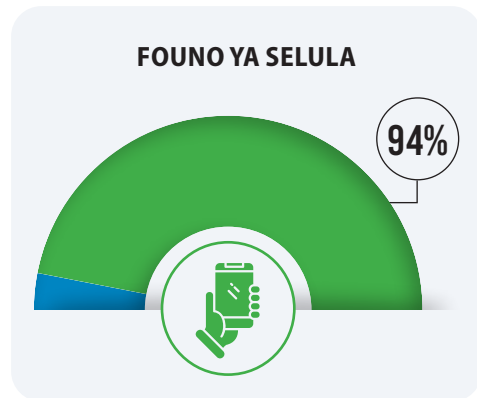


- Go ne go na le tshepo e e kwa tlase mo ditsamaisong tsa puso tsa go tsaya ditshwetso le mo go fetoleng ditso mo ditheong tsa saense.
- Pharologano e e fa gare ga maduo a a kwa godimo le a a kwa tlase, go ya ka ditlhopho tse dinnye, a go ikanya dithulaganyo tsa puso tsa go tsaya ditshwetso e ne e le maduo a le 11 fela; fa pharologano ya go dumalana gore ditso mo ditheong tsa saense di a fetoga e ne e le maduo a le 8 fela.
- MaAforika Borwa a na le go nna le maikutlo a a tshwanang malebana le go tsaya ditshwetso ga puso le go fetola ditso mo mafelong a tiro a saense, go sa kgathalesege gore ba tswa mo maemong a a farologaneng.
- Batho ba bagolo ba bantsho ba Aforika ba ne ba tshepa thata dithulaganyo tsa puso tsa go tsaya ditshwetso e bile ba dumalana thata le diphetogo tsa ditso mo ditheong tsa saense.

# 9 Tshedimosetso ya S&T: Phitlhelelo, go nna le seabe, tiriso le go tshepiwa

Kamano e e siameng magareng ga saense le setšhaba e ikaegile ka go abelana tshedimosetso ya S&T le go netefatsa gore setšhaba se kgona go fitlhelela le go tshepa tshedimosetso eno. Go fitlhelela ga setšhaba didiriswa tsa dijithale le Internet go na le seabe sa botlhokwa mo go kgontsheng batho go fitlhelela tshedimosetso.

Ka ngwaga wa 2022, phitlhelo ya dijithale le inthanete e ne e le:



**Batho ba le 3 mo go ba le 4**  
ba ne ba kgona go tsema mo Inthanete



**Batho ba le 6 mo go ba le 10**  
ba ne ba na le smartphone



## 9.1 Mekgwa ya go tseno le go dirisa Internet

Motho a le 1 mo go bangwe le bangwe ba le 4



ba ba godileng o ne a sa kgone go tseno mo Internet

Motho a le 1 mo go ba le 3



ba ba godileng o dirisa Internet gangwe le gape (go feta diura di le nne mo malatsing a le mantsi)

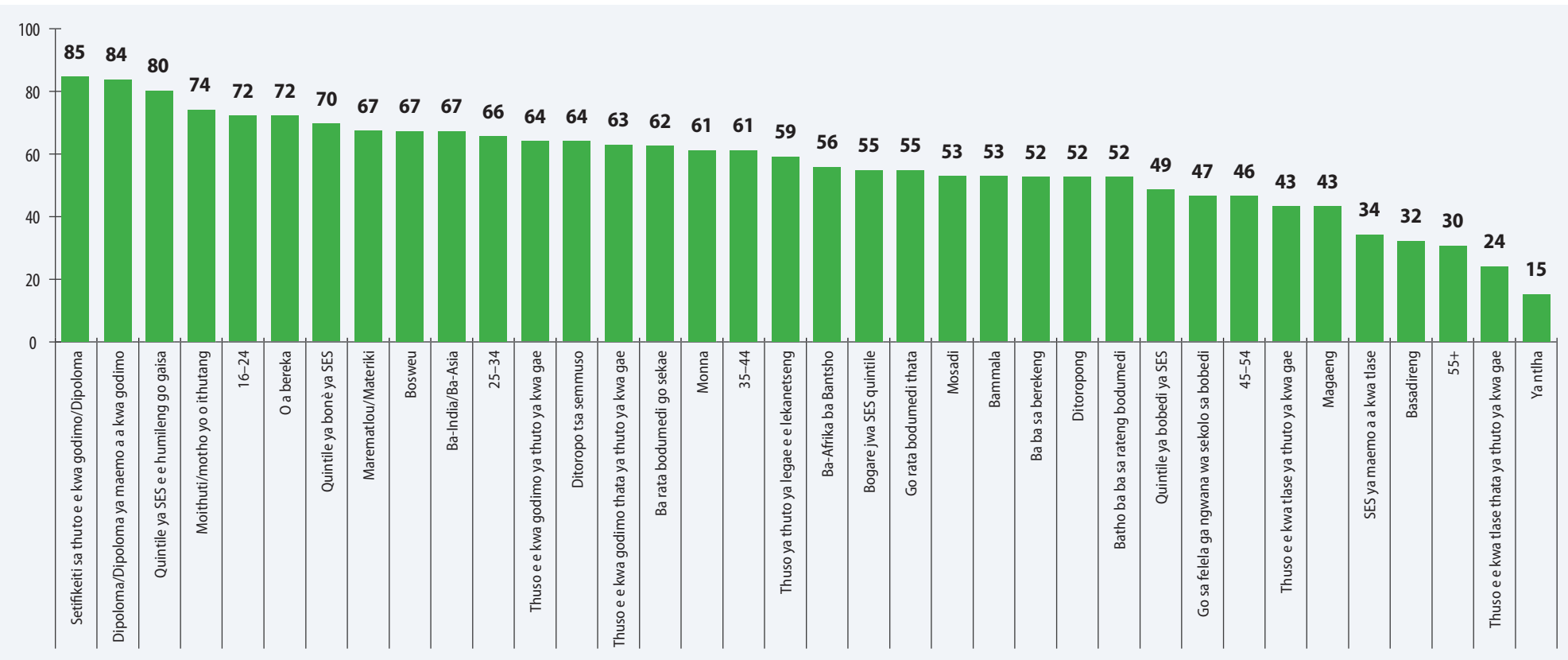
Tiriso ya letsatsi le letsatsi ya Internet e ne e farologana thata, go tswa go 85% ya ba ba nang le thuto ya tertiary go ya go 15% ya ba ba nang le thuto ya poraemari fela.

### Ke mang yo o neng a dirisa Internet thata?

Ba ba neng ba dirisa Internet thata e ne e le:

- bagolo ba ba nang le maduo a thuto a matric le go feta, le thuso ya thuto e e kwa godimo ya kwa gae,
- ba basha,
- baithuti, ba ba ithutang, le ba ba thapilweng,
- go tswa mo malapeng a a humileng a SES, le
- Bagolo ba basweu le ba Baintia/Ba-Asia.

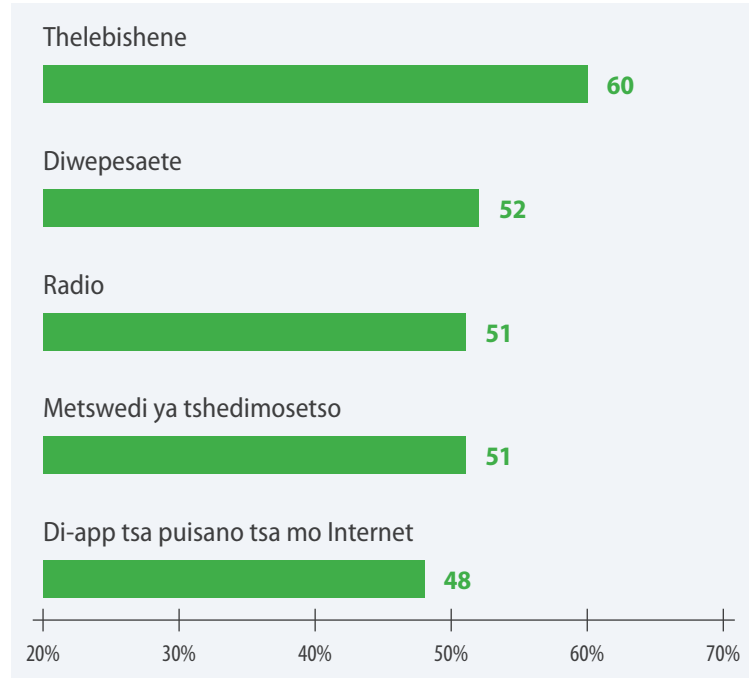
### Tsela e batho ba dirisang Internet ka yone letsatsi le letsatsi go ya ka dipalo tsa batho ba ba nngang mo go yone (%)



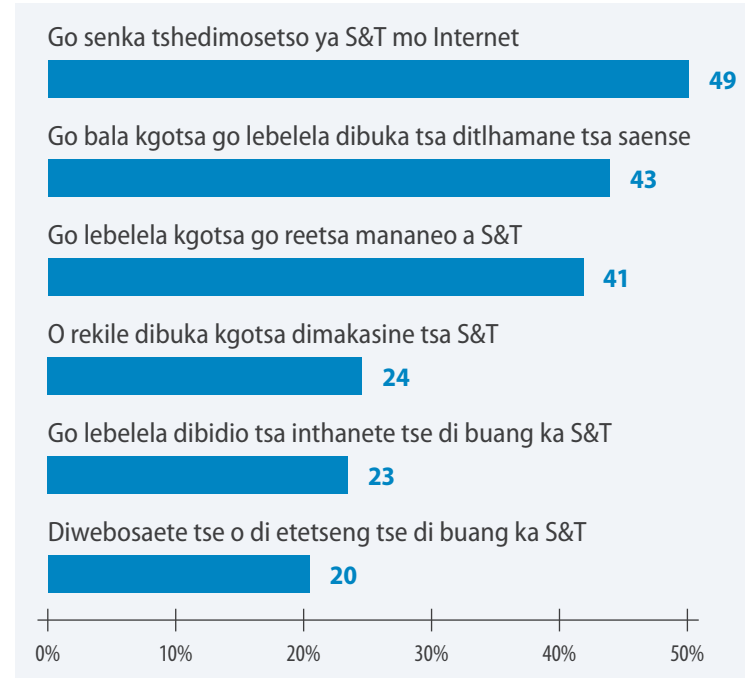
## 9.2 Go tlhagelela mo tshedimosetsong ya S&T le go e dirisa

Tshedimosetso e botlhokwa thata mo go direng ditshwetso mme e ka nna ya tlhotlheletsa ditiro le boitshwaro. Setšhaba se ne sa bega gore se ne se na le tshedimosetso e nnye ya S&T (e ba e amogelang) le go e dirisa (e ba e dirisang ka matlhagatlhaga).

### Metswedi e e tumileng thata ya dikgang tsa S&T (% bobotlana beke le beke)



### Ditsela tse di tlwaelegileng tsa go dirisa tshedimosetso ya S&T (% ka dinako tse dingwe)



- Go ne go na le pharologano e kgolo ya maduo a go nna le tshedimosetso ya S&T le go e dirisa go ya ka ditlhopha tse dinnye, ka maduo a a neng a simolola ka 22 go ya go 51 mo go a le 100 a go nna le tshedimosetso le 27 go ya go 47 a go dirisa tshedimosetso.
- Ba ba neng ba lebagane le tshedimosetso e ntsi ya S&T ba bo ba e dirisa:
  - o ne a na le thutego e e kwa godimo,
  - o ne a na le thuso ya thuto e e kwa godimo kwa gae, le
  - ne o le monnye, o le moithuti e bile o ithuta.

Bagolo ba le 2  
mo go ba le 10

ba ne ba amogela  
tshedimosetso e ntsi ya S&T



Motho a le 1  
mo go ba le 20

ba ba godileng o ne a dirisa  
tshedimosetso e ntsi ya  
saense le thekenoloji



SETLHOGO SE SE  
ITUMELENG SE SE KGANG  
DITLHOGO TSA S&T

Thelebishene

60%



TSELA E E RATEGILENG GANTSI  
YA GO FITLHELELA TSELA  
YA GO FITLHELELA TSA S&T  
INFORMATION

Go senka mo Inthanete

49%

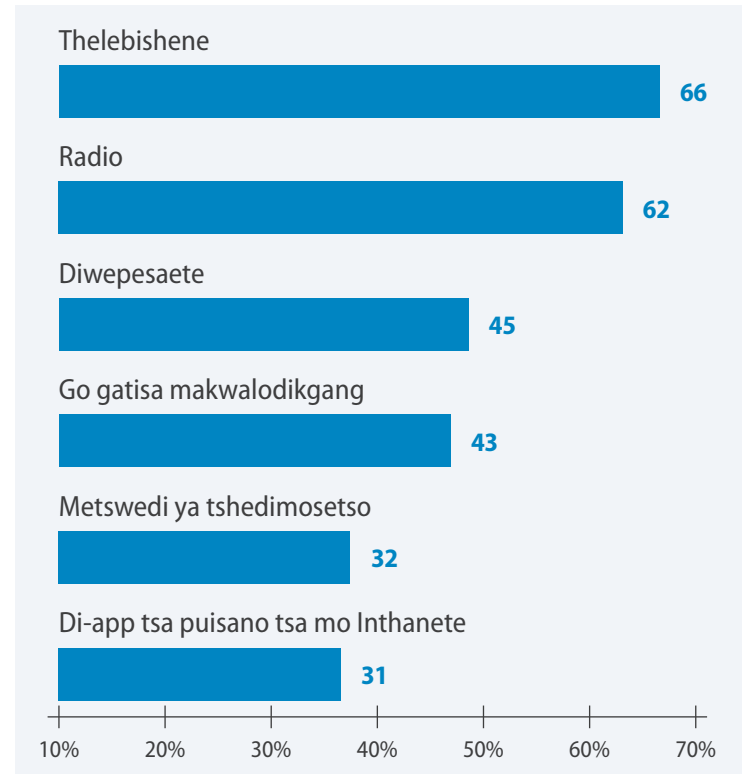


## 9.3 Go Ikanya Dikgang le Metswedi ya Tshedimosetso

Go ikanya dikgang (%)



Go ikanya metswedi ya tshedimosetso ya S&T (%)



- Go sa kgathalesege go farologana ga maemo a bone, Maaforika Borwa a na le go nna le maemo a a tshwanang a go tshepa metswedi ya dikgang tsa S&T.
- Ba ba neng ba tshepa thata metswedi ya dikgang tsa S&T e ne e le bagolo ba ba rutegileng thata, ba ba neng ba na le tshegetso e e kwa godimo ya thuto ya kwa gae, le ba ba neng ba le basha, baithuti, ba ba ithutang, le ba ba sa berekeng.

Bagolo ba le 6  
mo go ba le 10

ba ne ba kgotsofetse ka tsela e  
metswedi ya dikgang e neng e  
bega dikgang tsa S&T ka yone

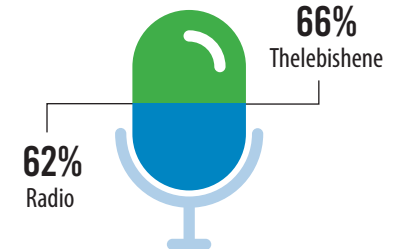


GO DIRISEDIWA DIK GANG  
TSE DIKGOLO TSA  
DIK GANG TSA DIK GANG  
Metshameko

69%



METLHA E E ITSEGANG GO  
GANTSI E E ITSEGANG KA S&T  
Thelebishene le radio



# 10 Ditlamorago tsa go dira tiro ya saense: Ditiro le maitsholo

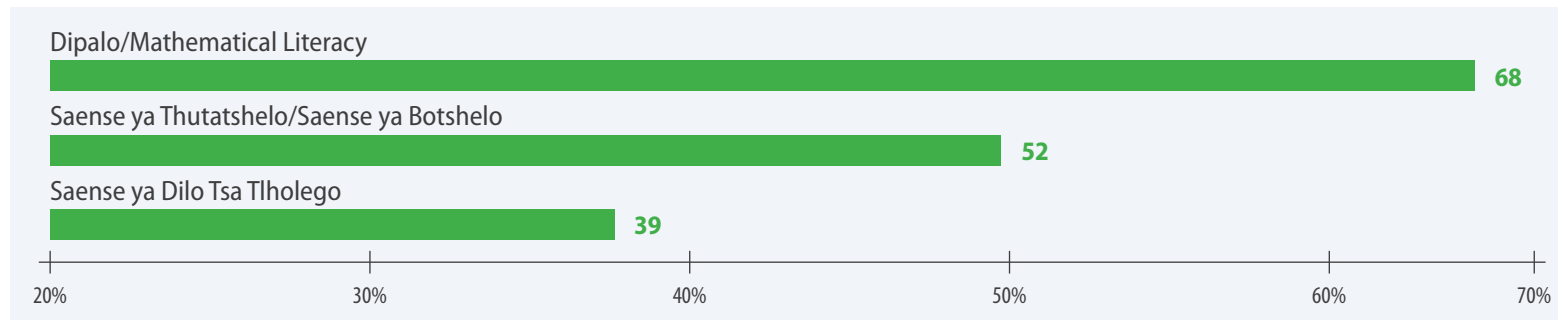
Batho ba ba neng ba botsolodiwa ba ne ba bodiwa gore a ba kile ba nna le seabe mo ditirong kgotsa mo ditiragalong tse di farologaneng tse di amanang le S&T, ka gone go dira jalo go bontsha gore ba rata saense. Ditiro kgotsa ditiragalo di ne tsa kgaogangwa ka mefuta e le metlhano e megolo ya ditiro: tiro ya sekolo, tiro ya go ngoka batho, tiro ya setšhaba, tiro ya go abelana tshedimosetso le tiro ya go dirisa ditiriso tsa mo inthaneteng.



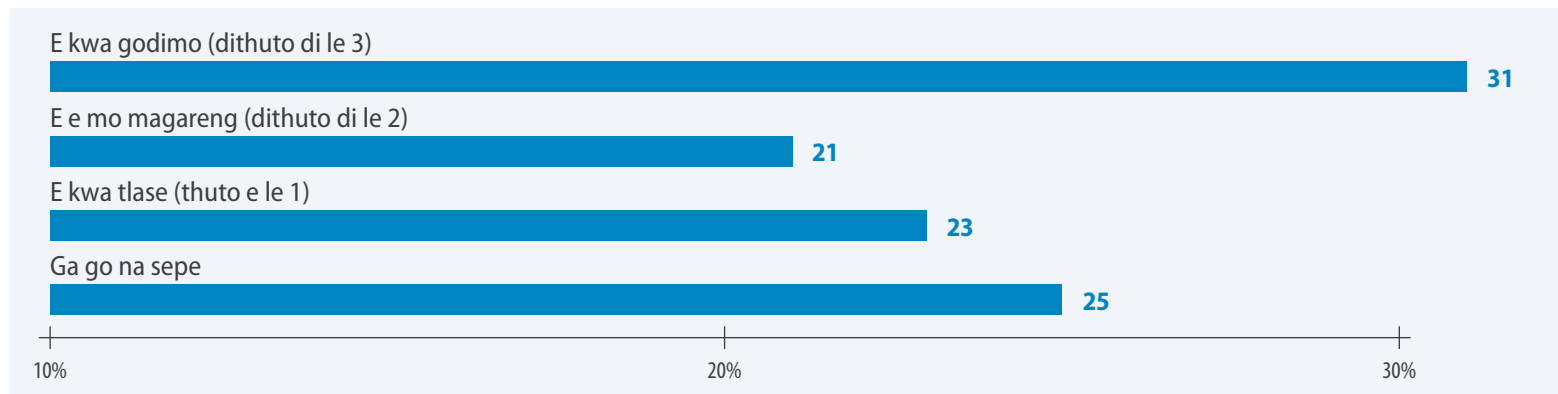
## 10.1 Go nna le seabe mo dithutong: Selekanyo sa go kopana le dithuto tsa STEM kwa sekolong

Kitso ya saense le boikutlo jo motho a nang le jone ka saense di a amana. Batho ba ba neng ba botsolodiwa mo patlisisong ya SAPRS ba ne ba bega ka dithuto tsa STEM tse ba neng ba di tlhophile go di ithuta kwa sekolong morago ga Kereiti 9.

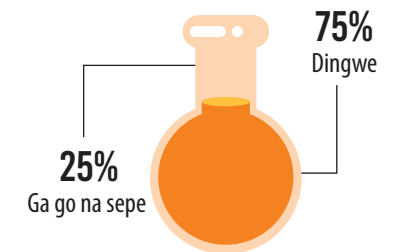
### Go kopana le dithuto tsa STEM morago ga Kereiti ya 9 (%)



### Tlhotlomiso ya STEM:Dingwe



Go kopana le dithuto dingwe le dingwe tsa STEM morago ga Kereiti ya 9



**Bagolo ba le 3 mo go bangwe le bangwe ba le 10**

ba ne ba tshwaeditswe thata ke STEM, fa ba ne ba tsaya batho botlhe ba bararo ba ba neng ba botsolodiwa ka STEM morago ga Kereiti ya 9




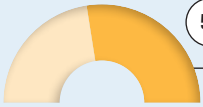


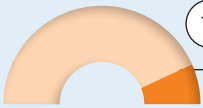










Batho ba ba nang le seabe se segolo mo dilong tsa STEM:

- ba ne ba na le maemo a a kwa godimo a thutego le thuso e e kwa godimo ya thuto kwa gae,
- ba ne ba tswa mo malapeng a a nang le SES e e kwa godimo,
- e ne e le basha, baithuti, baithuti, le ba ba thapilweng, le
- go ne go ka direga thata gore e nne batho ba ba godileng ba basweu.

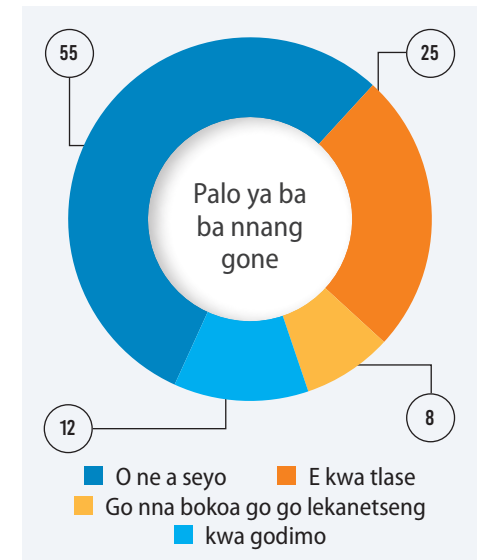
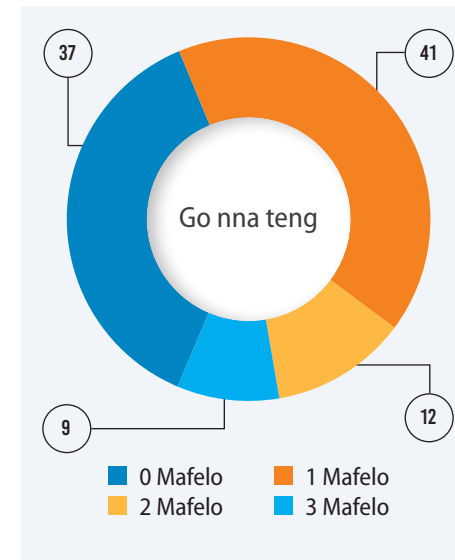
## 10.2 Ditiro tse di ikaegileng ka kgogedi: Go nna teng le go nna teng kwa mafelong a S&T

Batho ba ba neng ba araba patlisiso ya SAPRS ba ne ba bega gore a go na le mafelo a S&T le ditiro mo mafelong a bone le gore a ba kile ba a etela. Mo e ka nnang nngwetharong ya batho (37%) ba ne ba se na mafelo a S&T, a a jaaka dilaeborari, dimusiamo kgotsa ditheo tsa S&T gaufi le magae a bone, fa mo e ka nnang halofo (55%) e ne e ise e ye kwa mafelong ape a S&T kgotsa kwa ditiragalong dipe.

### Go nna teng le go nna teng kwa mafelong a S&T le kwa ditiragalong (%)

	Mafelo le ditiro tsa S&T	E teng mo lefelong leo	Ba ne ba nna gone
	Laeborari ya botlhe	 55	 30
	Ditiro tsa saense tsa setšhaba, jaaka go phepafatsa, go tsamaya mo tikologong	 14	 18
	Musiamo	 12	 23
	Tshingwana ya botaniki, lefelo le le sireleditsweng la tlhologo kgotsa la diphologolo, serapa sa diphologolo, aquarium	 10	 26
	Lefelo la Saense le Thekenoloji kgotsa Lefelo la Dipontsho	 7	 16

### Go nna teng le go nna teng kwa mafelong a S&T le kwa ditiragalong (%)

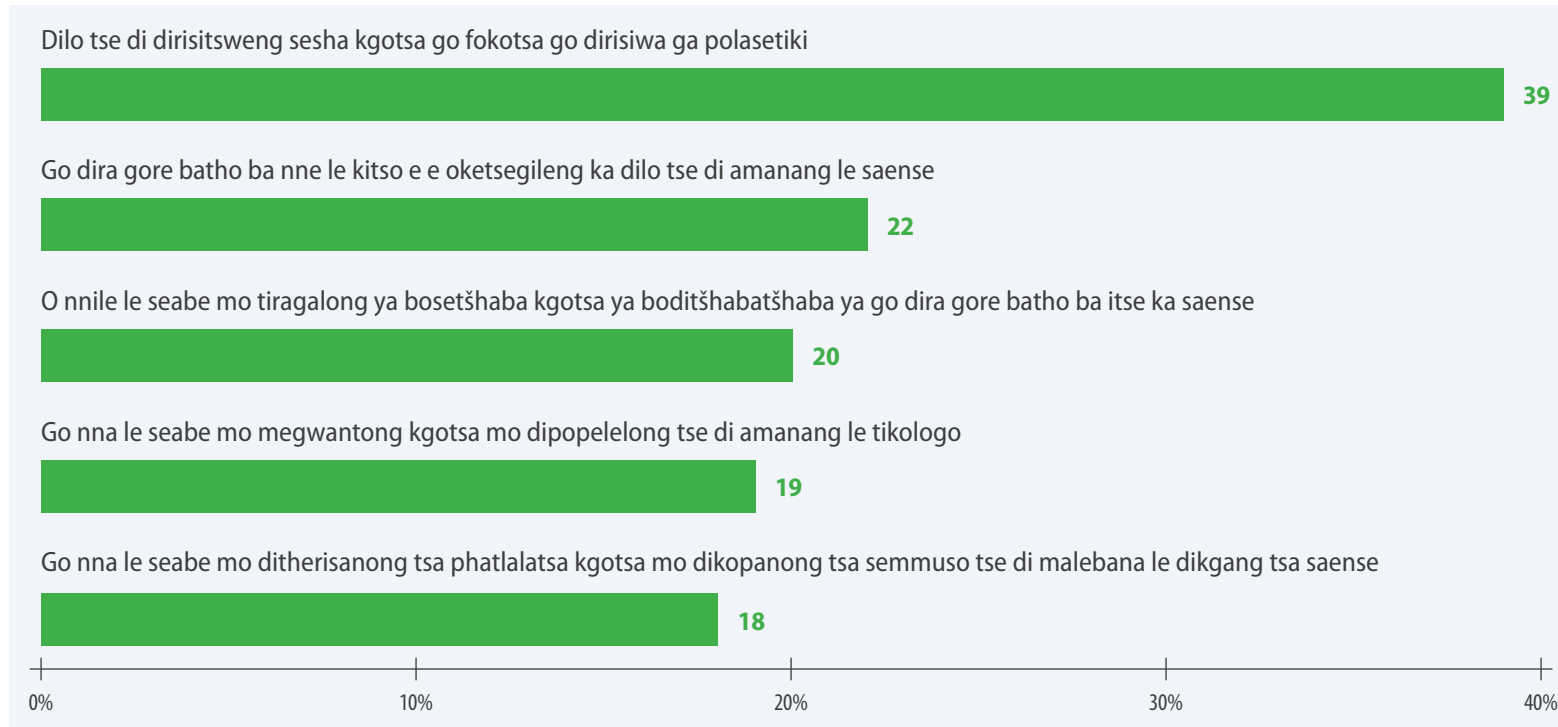


### Batho ba go ka diregang thata gore ba nne teng kwa ditiragalong le mo ditiragalong tsa S&T:

- ba ne ba na le maduo a thuto a matric le kwa godimo, le thuso ya thuto e e kwa godimo kwa gae,
- ba ne ba tswa mo malapeng a a nang le SES e e kwa godimo,
- ba ne ba nna mo mafelong a a rulagantsweng le a a sa rulaganngwang mo ditoropong,
- ba ba thapilweng, baithuti le ba ba ithutang,
- ba ne ba nna gaufi le mafelo a S&T, mme ba ne ba utlwa le go dirisa tshedimosetso e ntsi ya S&T.

## 10.3 Go nna le seabe mo setšhabeng

### Go nna le seabe mo ditiragalong tsa setšhaba tse di amanang le saense (% ka dinako tse dingwe)



#### Ke bomang ba ba nang ba nna le seabe se segolo mo ditirong tsa setšhaba?

- Dipharologano tsa palogare ya maduo, go ya ka ditlhopho tse dinnye, di ne di farologana go tswa go 8 go ya go 33.
- Ba ba nang ba ka nna le seabe se segolo mo ditirong tsa saense tse di ikaegileng ka setšhaba e ne e le:
  - bagolo ba ba nang le maduo a thuto a matric le go feta,
  - bathapiwa, baithuti le barutwana, le
  - ba ba nnang mo ditoropong tse di rulagantsweng le mo ditoropong tse di sa rulaganngwang.

#### Mo e ka nnang mogolo a le 1 mo go ba le 7

o ne a bega gore go na le ditiro tsa saense tse di dirwang ke batho botlhe tse di jaaka go phepafatsa mo lefelong le o nnang mo go lone le go tsamayatsamaya mo tikologong



#### Motho a le 1 mo go ba le 10

ba bagolo o ne a nna le seabe ka metlha mo ditirong tse di dirwang mo setšhabeng



#### SE BATHO BANGWE BA SE DIRANG

Go dirisa dilo tse dingwe gape kgotsa go fokotsa tiriso ya polasetiki



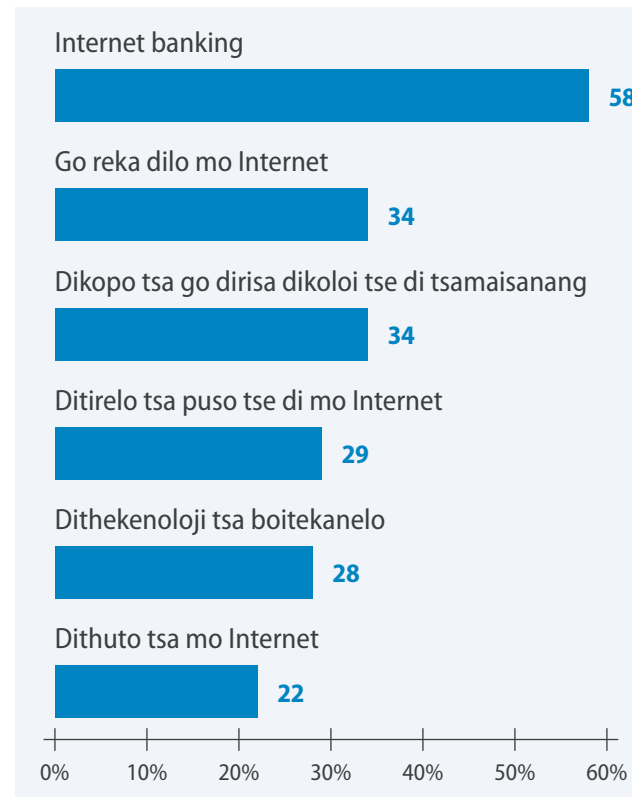
## 10.4 Tirisanommogo ya go abelana tshedimisetso le tirisanommogo le ditiriso tsa inthanete

Mo godimo ga go amogela tshedimisetso ya S&T, setšhaba se ne sa abelana tshedimisetso, mmogo le go dirisa ditiriso tsa inthanete. Go ne go na le selekanyo se se kwa tlase sa go abelana tshedimisetso, mmogo le tiriso ya ditiriso tsa inthanete mo gare ga setšhaba. Setšhaba se ne se abelana tshedimisetso ya S&T gantsi le ba lelapa, ditsala kgotsa badirimmo; mme app e e neng e dirisiwa thata mo inthaneteng e ne e le Internet banking.

### Go abelana tshedimisetso: jang le mang (%) ka dinako tse dingwe



### Tiriso ya ditiriso tse di rileng tsa mo inthaneteng (bonnye ka dinako tse dingwe)



Bagolo ba le 2  
mo go ba le 10

ba abelana tshedimisetso e bile ba dirisa di-app tsa mo Internet ka metlha



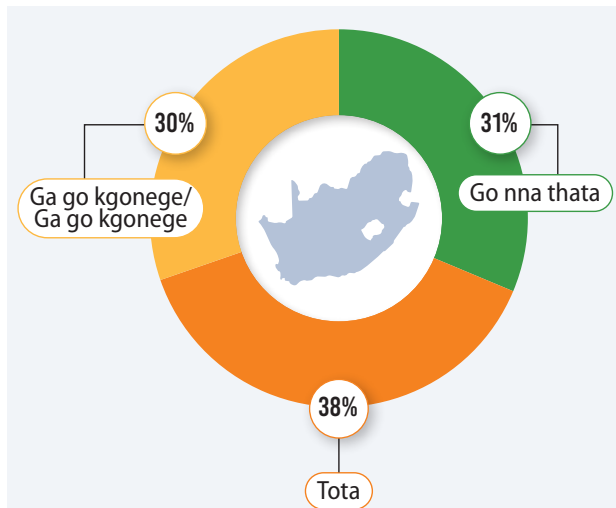
- Go ne go na le pharologano e kgolo ya maduo, ka ditlhophha tse dinnye, mo go abelaneng tshedimisetso go tloga ka 18 go ya go 46, le mo go diriseng ditiriso tsa mo inthaneteng go tloga ka 11 go ya go 56, ka bobedi go tswa mo go 100.
- Batho ba ba neng ba abelana tshedimisetso e ntsi le ba ba neng ba bega gore ba dirisa thata ditiriso tsa mo Internet ba ne ba na le go:
  - ba na le thutego e e kwa godimo le thuso e e kwa godimo ya thuto kwa gae,
  - ba na le SES e e kwa godimo,
  - ba nne basha, ba bereke, e le baithuti, le ba ba ithutang, le
  - nna mo mafelong a a rulagantsweng le a a sa rulaganngwang a ditoropo.
- Batho ba bagolo ba bantsho ba kwa Afrika ba ne ba na le tshono e ntsi ya go abelana tshedimisetso, fa batho ba bagolo ba Baintia/Ba-Asia le ba Basweu ba ne ba na le tshono ya go bega gore ba dirisa ditiriso tse di rileng tsa mo Internet thata.

# 11 Maikutlo a boikgantsho, ditsholofetso le dilo tse di tlang pele ka ga thulaganyo ya bosetšhaba ya go tlhama dilo

## 11.1 Go ikgantsha ka diphithlelelo tsa S&T tsa Aforika Borwa

Setšhaba se se nang le kitso ya saense se ikaegile ka mekgwa e e amogelang le go tshegetsa thulaganyo ya bosetšhaba ya go dira dilo tse disha. Le fa bagolo ba le supa mo go ba le lesome ba ne ba le motlotlo thata kgotsa ba le motlotlo thata ka diphithlelelo tsa S&T tsa Aforika Borwa, ba ne ba na le pono e e siameng ka diphithlelelo tseo fa di bapisiwa le dikgaolo tse dingwe tsa lefatshe, mme ke kwatara fela e e neng e dumela gore Aforika Borwa e botoka go na le Yuropa le Amerika Bokone.

### O motlotlo go le kana kang ka diphithlelelo tsa S&T tsa Aforika Borwa (%)?



### Diphithlelelo tsa S&T tsa Aforika Borwa di bapisiwa jang le dikgaolo tse dingwe tsa lefatshe?

Aforika Borwa e botoka go na le ...	Ke diperesente di le kae tse di dumalanang
Dikarolo tse dingwe tsa Afrika	67%
Yuropa le Amerika Bokone	25%
Dinaga tsa Asia	18%

- Palogare ya maduo, go ya ka ditlhophatse di potlana, e ne e farologana go tswa go 24 go ya go 40 mo go 100 go bontsha boikgantsho jo bogolo, le go tswa go 30 go ya go 41 mo go 100 go bontsha ba ba neng ba leba diphithlelelo tsa S&T tsa Aforika Borwa di le botoka go na le tsa dikgaolo tse dingwe tsoatlhe. Se se raya gore maAforika Borwa a ne a na le mokgwa o o tshwanang wa go ikgantsha ka diphithlelelo tsa S&T, go sa kgathalesege gore ba tswa kae.
- Ba ba neng ba bega fa ba le motlotlo thata ka diphithlelelo tsa S&T e ne e le bagolo ba Bantsho ba Aforika, ba ba nang le thutego e e kwa godimo, ba ba amogetseng tshegetso e e kwa godimo ya thuto ya kwa gae, le baithuti le baithuti.
- Ba ba boneng diphithlelelo tsa S&T tsa Aforika Borwa di le botoka go na le tsa dinaga tse dingwe e ne e le bagolo ba bantsho ba Aforika, ba ba nang le thutego e e kwa tlase le maemo a a kwa godimo a tshegetso ya thuto ya kwa gae, le ba ba nnang mo mafelong a a sa rulagannngwang a ditoropo.
- Ka fa letlhakoreng le lengwe, ba ba neng ba leba diphithlelelo tsa S&T tsa Aforika Borwa jaaka tse di seng botoka go na le diphithlelelo tsa dinaga tse dingwe e ne e le bagolo ba Maindia/Ma-Asia le Basweu, ba ba nang le thuto e e kwa godimo, le ba ba nnang mo malapeng a a humileng thata a SES.

## 11.2 Tsholofetso ya bokgoni jwa S&T mo basheng

Setšhaba se ne sa supa tsholofetso ya bokgoni jwa S&T mo basheng e le e e kwa godimo. Seno se romela molaetsa o o siameng mo basheng ka ga botlhokwa le boleng jwa bokgoni jwa S&T.

Basha ba tshwanetse go  
rotloediwa go ithuta ka S&T

86



S&T e baakanyetsa basha go tsibogela  
dikgwetlho mo baaging ba lefelo leo

76

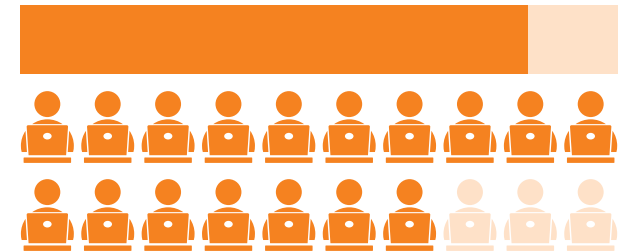


### Dikarolo tsa batho ba ba neng ba re bokgoni jwa S&T bo na le matswela

- MaAforika Borwa a ne a na le go nna le pono e e siameng ka tsholofetso ya bokgoni jwa S&T mo basheng, go sa kgathalesege go farologana ga bona.
- Ba ba neng ba lemoga gore go na le ditsholofetso tse dikgolo tsa S&T ba ne ba na le:
  - go feta thuto ya motheo,
  - go ne ga nna le dipalo tse di kwa godimo tsa batho ba ba neng ba sa tsene sekolo.

Bokgoni jwa go dirisa didirisiwa tsa eleketroniki le  
dikhomputara bo botlhokwa thata mo basheng

85



Borutegi jwa S&T bo naya batho ba baša ditshono tse  
dintsi tsa tiro go na le borutegi jo bongwe

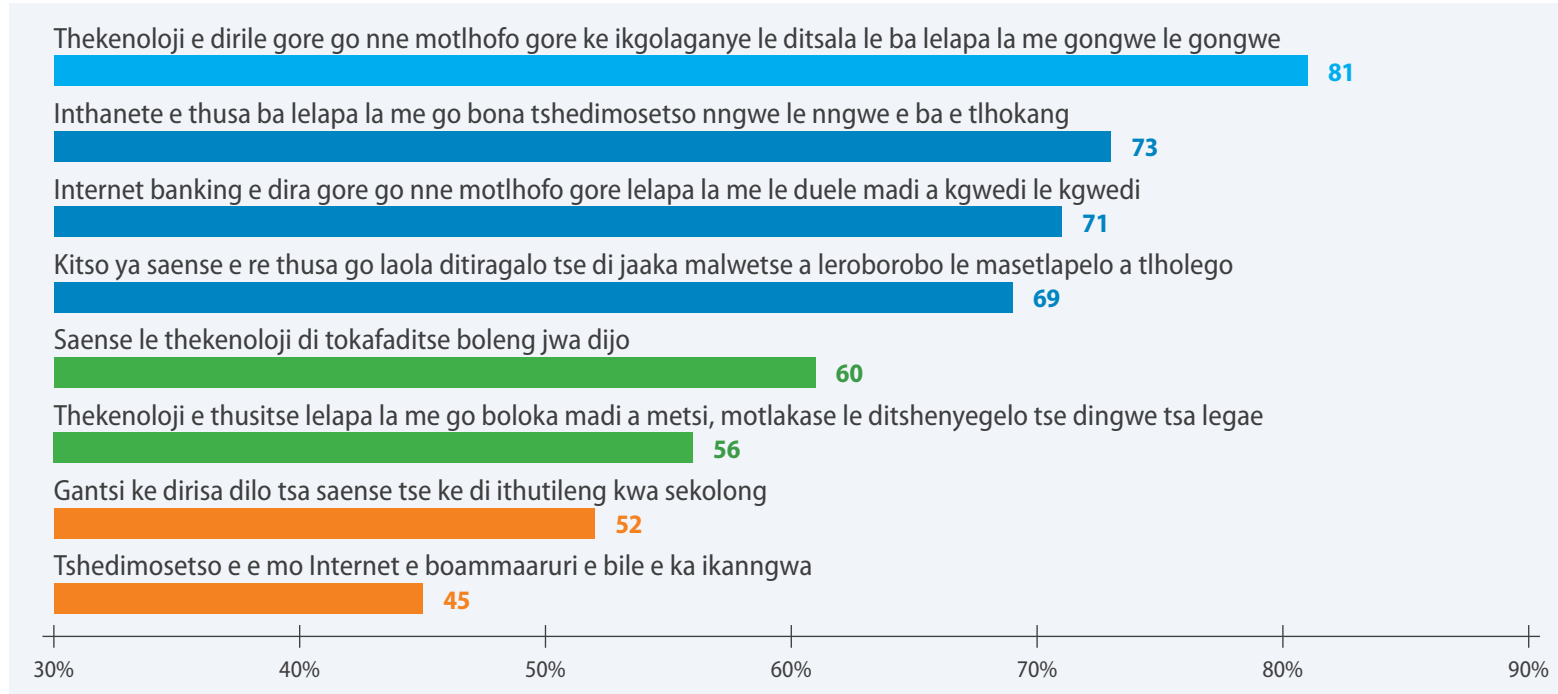
76



## 11.3 Boleng jwa maitemogelo a S&T mo botshelong jwa letsatsi le letsatsi

Go motlhofo gore re tseye sengwe se le botlhokwa fa re se tsaya se le botlhokwa mo botshelong jwa rona.

### Boleng jwa maitemogelo a S&T mo botshelong jwa letsatsi le letsatsi (% tumalano)



### KGATLHO E KGOLO YA TUMELANO

Thekenoloji e dira gore go nne motlhofo gore ba lelapa le ditsala ba kgone go ikgolaganya

81%



### DINTLHA TSE DINGWE TSA TUMELANO

Go tlhomama le go ikanyega ga Inthanete

45%



Bagolo ba le 6 mo go ba le 10

ba ne ba tsaya S&T e le botlhokwa ka gonne e tokafatsa boleng jwa dijo



60%

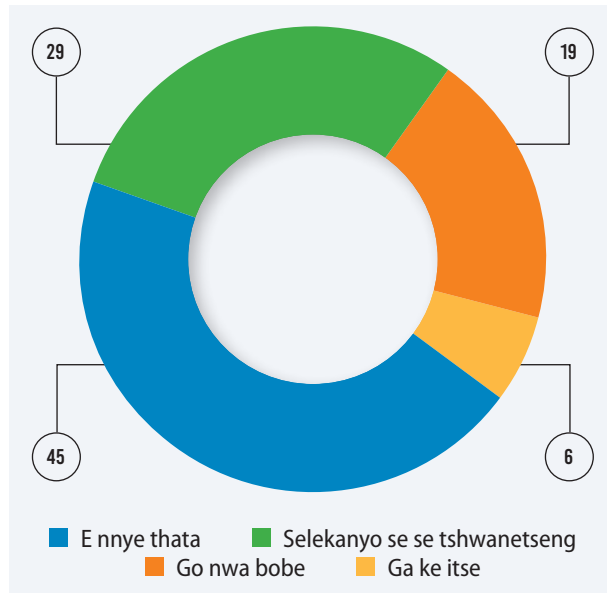
### Ke mang yo o neng a tsaya maitemogelo a S&T a le botlhokwa thata?

- Batho ba le robedi mo go ba le lesome ba ne ba tsaya S&T e le botlhokwa ka gonne e ba thusa go nna le kamano le ba lelapa le ditsala, fa ba le supa mo go ba le lesome ba ne ba tsaya S&T e le botlhokwa ka gonne e ba naya kitso e bile e ba thusa mo botshelong jwa bone jwa letsatsi le letsatsi.
- Batho ba ba kwa tlase ga halofo ba ne ba dumela gore tshedimosetso e e mo Internet e boammaaruri e bile e ka ikanngwa.
- Ba ba neng ba tsaya maitemogelo a S&T a le botlhokwa thata:
  - o ne a na le thuto e e fetang ya poraemari le thuto e e kwa godimo ya kwa gae,
  - ba ne ba le basha, e le baithuti e bile ba ithuta, mme
  - ba bontshitse kitso e e kwa godimo le kgatlhego mo go S&T.

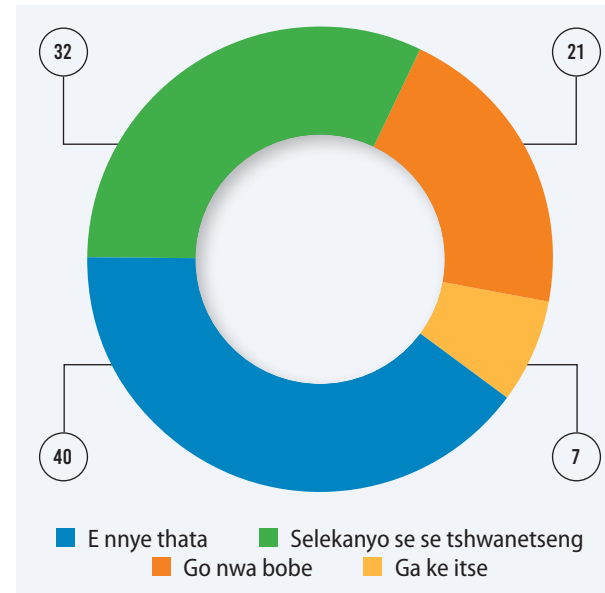
## 11.4 Tshegetso ya puso mo ditshenyegelong tsa R&D tsa saense le thekenoloji

Maikutlo a setšhaba ka ga dipeeletso mo dipatlisong le mo tlabololong (R&D) a bontsha puso gore tekanyetsokabo e ka abelwa jang. Setšhaba se ne se na le pono ya gore madi a a dirisiwang ke puso le dikgwebo tse dikgolo mo go R&D mo go S&T a tshwanetse go bolokiwa kgotsa a okediwe.

Ditshenyegelo tsa puso mo go R&D (%)



Ditshenyegelo tsa kgwebo mo go R&D (%)



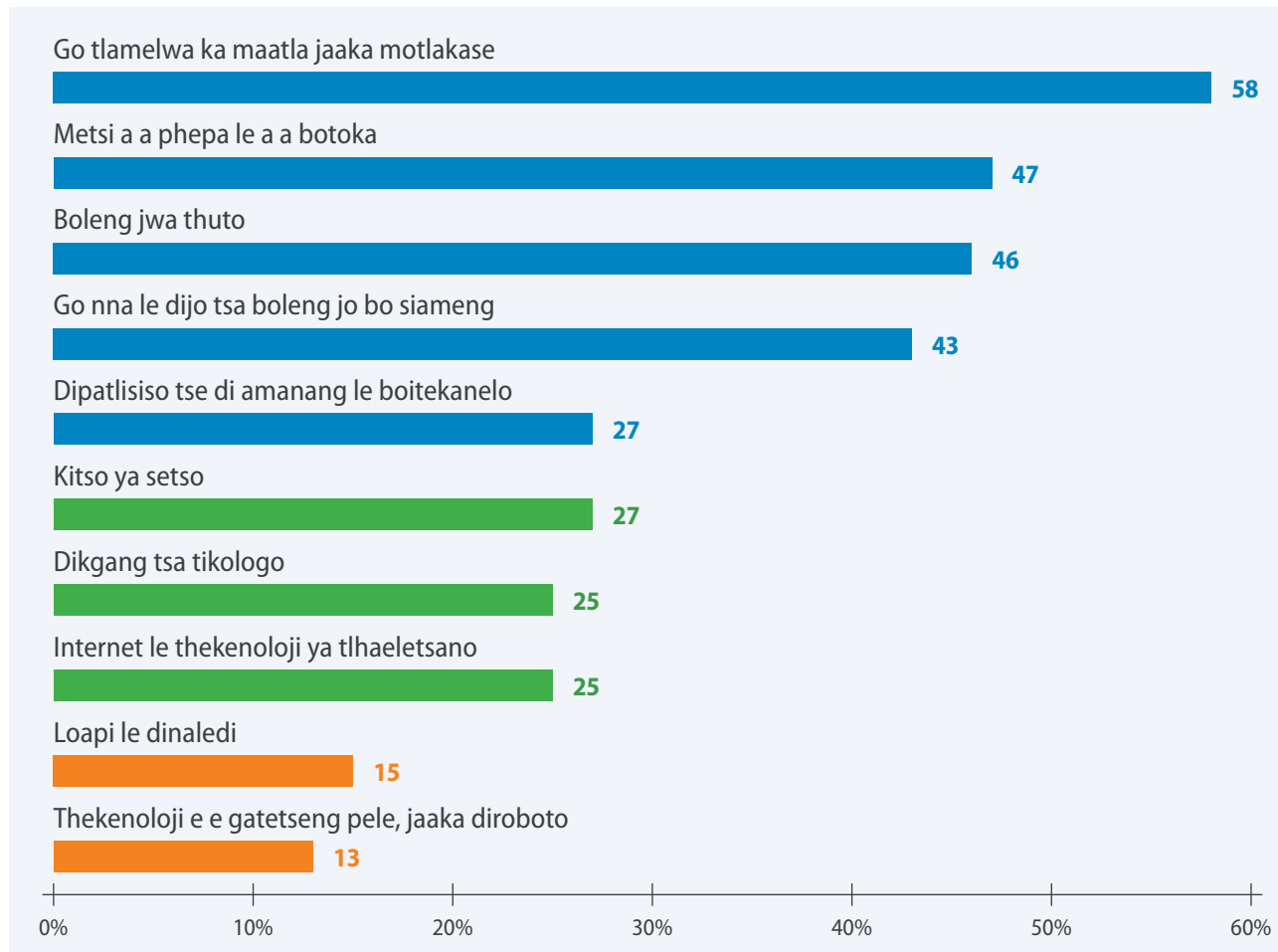
### Dikarolo tsa ba ba amegileng thata ka gore ditshenyegelo tsa R&D di kwa tlase thata

- Tshegetso ya madi a puso e a dirisang mo go R&D mo go S&T e ne ya farologana thata, go ya ka ditlhopha tse dinnye, go tloga go 31 go ya go 68 mo go tse 100. Seno se bontsha gore batho ba na le dikgopolo tse di sa tshwaneng.
- Ba ba neng ba tshwenyegile thata ka gore selekanyo sa madi a a dirisiwang mo go R&D ga jaana se kwa tlase thata e ne e le:
  - ba ba nang le borutegi jwa teritiary,
  - bao ba leng mo go ba le batlhano ba ba humileng go gaisa ba SES, le
  - Batho ba ba godileng ba basweu, ba mmala, ba Baidia/ba Ba-Asia.

## 11.5 Ditlapele tsa patlisiso ya S&T mo Aforika Borwa

Go tswa mo lenaaneng la ditlhogo tse di botlhokwa tsa S&T tsa segompieno, setšhaba se ne sa tlhophisa dikarolo tse nne tsa patlisiso tse ba neng ba akanya gore puso e tshwanetse go tswela go di tshegetsa ka madi. Dilo tse di neng di tsewa di le botlhokwa thata e ne e le go tlamelwa ka motlakase, metsi le boleng jwa thuto; mme tse di neng di tsewa di se botlhokwa go le kalo e ne e le tsa lefaufau le dinaledi le botegeniki jwa maemo a a kwa godimo, jo bo jaaka diroboto.

### Ditlapele tsa patlisiso tsa Aforika Borwa tsa madi a patlisiso ya isagwe (%)



### SELO SE SE TLOTLEGILENG GO TLOGELA

Go tlamelwa ka motlakase

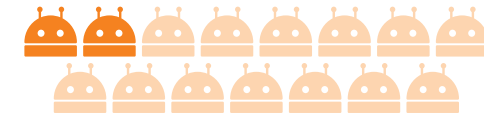
58%



### SETLAPELE SE SE KWA TLASE

Thekenoloji e e gatetseng pele, e e jaaka diroboto

13%

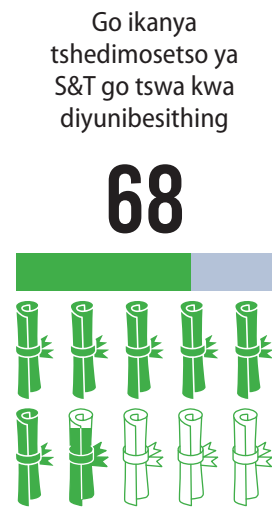
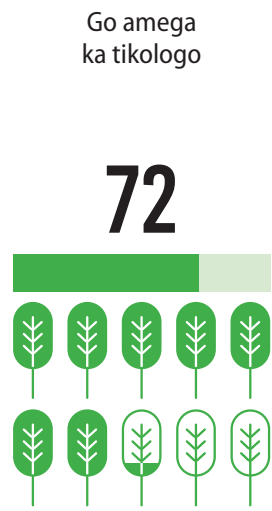
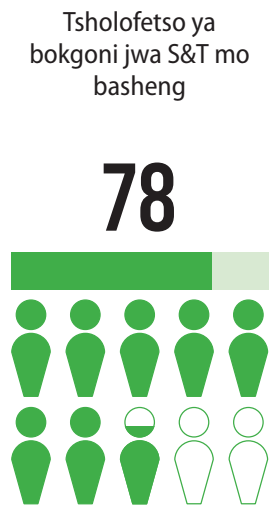


- Dilo tse tlhano tse di kwa godimo tse di tlang pele mo dipatlisisong tse di tla tshegediwang ka madi mo isagweng (dithobane tse di pududu), tse di tlhophilweng ke setšhaba di tsewa e le tse di potlakileng e bile di le botlhokwa. Di emela dikgwetlho tsa segompieno tsa loago, tse ditlamorago tsa tsone e leng karolo ya maitemogelo a letsatsi le letsatsi a setšhaba.
- Setlhophisa sa bobedi sa dilo tse di tlang pele (dithobane tse di tala) se ka tlhalosiwa e le "sa botlhokwa, mme ga se sa potlako".
- Setlhophisa sa boraro sa dilo tse di tlang pele se ka nna sa wela mo setlhopheng sa "patlisiso ya loapi lo lotala", koo dikopo tsa mmatota tsa lefatshe di sa lemotshegeng ka bonako mo bathong.

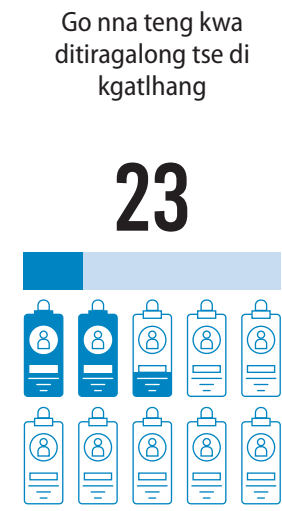
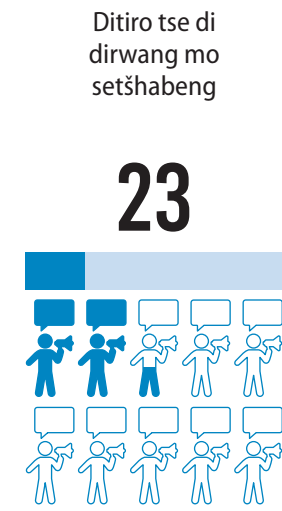
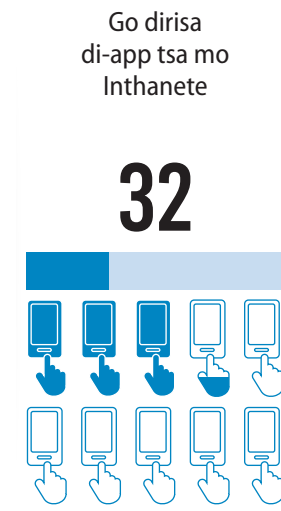
# 12 Letshwao la kamano ya setšhaba sa Aforika Borwa le saense

Mo go nngwe le nngwe ya dikarolo tse 27 tse di neng di tlhomilwe, re ne ra bala (i) palogare ya maduo a index (mo go tse 100), le (ii) go farologana ga maduo, ka go bala pharologano fa gare ga maduo a a kwa godimo le a a kwa tlase mo dikarolong tse di farologaneng.

## DIPALO TSE DI GOLEGILENG TSA DIPEGO E NE E LE TSA DITEKANYO TSA:



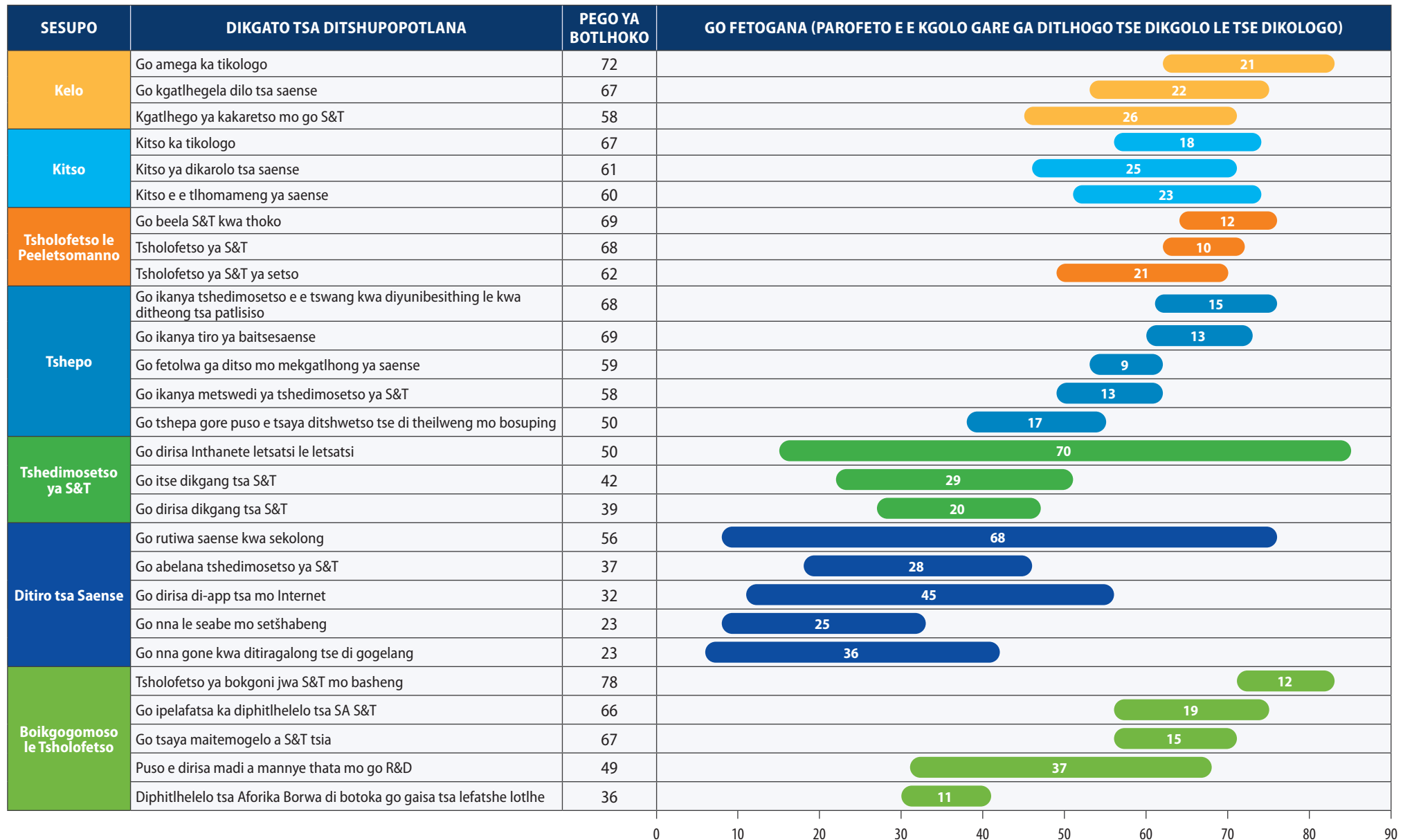
## MADUO A A KWA TLASE THAT E NE E LE A SELEKANYO SA:



Ka fa letlhakoreng le lengwe, dipalo tse di neng di le kwa godimo di ne di tsamaisana le go dirisa Internet letsatsi le letsatsi (70) le go ithuta dithuto tsa STEM kwa sekolong (68); mme dipalo tse di kwa tlase di ne di tsamaisana le go ikanya, go solofetso le go nna le boikutlo jwa go ikgogona. Dipharologano tse dinnye tse re di bitsang dikgato tsa tekatekano, di kaya gore batho ba na le dikgopolo tse di tshwanang, go sa kgathalesege gore ba farologane go le kana kang mo setšhabeng. Go farologana go gogolo ga maduo, go go bidiwang gore ke dikgato tse di farologaneng, go supa go sa lekalekane go go bakwang ke go farologana ga batho ba ba godileng mo setšhabeng.

Go tswa foo re ne ra dira “fingerprint” e e kgethegileng ya kamano ya setšhaba sa Aforika Borwa le saense ka go bontsha palogare ya maduo, mmogo le go farologana ga maduo a kgato nngwe le nngwe, e e bontshang ka tsela e e motlhofo pharologano ya kitso ya rona ya saense, boikutlo jwa rona le tsela e re dirang dilo ka yone.

## 12.1 Kitso ya saense, maitsholo le ditshupo tsa go nna le seabe, dikgato, palogare ya maduo, go fetoga ga maduo



## 12.2 Go kgaoganya dikgato ka ditlhopha di le nne

Gore re tlhaloganye botoka go farologana ga tsela e batho ba ikutlwang ka yone ka saense, re ne ra dirisa palogare ya maduo le go farologana ga one mo go sengwe le sengwe sa dilo tse di neng di lekwa. Re ne ra dira ditlhopha tsa maduo a a kwa godimo le a a kwa tlase (re dirisa maduo a a kwa godimo a a ka nnang 50 e le tekanyetso), le a a farologaneng (kgotsa a a farologaneng) le a a sa tshwaneng (kgotsa a a lekanang) (re dirisa maduo a a farologaneng a a ka nnang 20 e le tekanyetso). Re ne ra tlhama ditlhopha di le nne.

### GO GOA GONE RATINGS WITH HIGH AVERAGE

- Go tsaya maitemogelo a S&T tsia
- Boikgantsho mo diphitlhelelong tsa S&T tsa Aforika Borwa
- Tsholofetso ya bokgoni jwa S&T mo basheng
- Go solofetsa maikutlo go S&T
- Maikutlo a go ikgatholosa S&T
- Go ikanya tiro ya baitsesaense
- Go ikanya tshedimosetso e e tswang kwa diyunibesithing le kwa ditheong tsa patlisiso
- Go tshepa tshedimosetso ya S&T go tswa metsweding e e farologaneng
- Go fetolwa ga ditso mo mekgatlhong ya saense

### DIPONO TSE KGOLO TSE NANG LE DIPONO TSE NANG LE PALO E KGOLO

- Kitso ya dikarolo tsa saense
- Kitso e e tlhomameng ya saense
- Go kopana le dithuto tsa STEM tsa sekolo
- Kitso ka tikologo
- Go amega ka tikologo
- Kgatlhego ya kakaretso mo go S&T
- Kgatlhego mo dikarolong tse di rileng tsa S&T
- Tsholofetso ya S&T ya setso

### DI-MEDIUMS TSE DI FAROLOGANENG TSE DI NANG LE PALO E E KWA TLASE YA PALOGARE

- Go dirisa Inthanete letsatsi le letsatsi
- Go dirisa di-app tsa mo Internet
- Go itse dikgang tsa S&T
- Go dirisa dikgang tsa S&T
- Tlaganelo e e teng e tla bontsheng bontsi
- Go abelana tshedimosetso ya S&T
- Puso e dirisa madi a mannye thata mo go R&D

### GO GO GADGET LOW AVERAGE RATINGS

- Diphitlhelelo tsa Aforika Borwa di botoka go gaisa tsa lefatshe lotlhe
- Go tshepa gore puso e tsaya ditshwetso tse di theilweng mo bosuping



# 13 Ditlamorago tsa go tokafatsa kamano ya setšhaba le saense mo Aforika Borwa



1

## GO NNA LE SEABE GA SAENSE GO TSHWANETSE GA NNA LE SEABE MO THUTONG YA SAENSE LE LOAGO

Patlisiso eno, mmogo le tsela e DSI e lebang thulaganyo ya go nna le seabe mo go tsa saense ka yone, e theilwe mo mokgweng wa saense mo setšhabeng o o lemogang kamano e e fa gare ga saense le setšhaba, mmogo le seabe sa batho le ditheo.



2

## RE TSHWANETSE GO FETOLA TLHALOSO YA GORE RE TLHAOGANYA JANG LE GO TLHALOSA SETŠHABA SA AFORIKA BORWA

Maikutlo a ma-Aforika Borwa a akanyeditswe, a sekasekilwe, a lekalekane, mme a supa go itse ka ditlhabololo tsa S&T. Mo e ka nnang halofo ya dikgato tse di sekasekilweng, batho ba ne ba bontsha maikutlo a a tshwanang go sa kgathalesege gore ba tswa mo maemong afe a loago le a batho. Go ne ga nna le dipharologano fa gare ga batho ba ba neng ba araba ka ditsela tse dingwe.



3

## GA O KA KE WA DIRA PHOSO KA GO TOKAFATSA KITSO YA SAENSE

Mananeo a go dira gore batho ba itse ka saense a tshwanetse go dirwa ka ditsela tse dintsi tsa setso le tsa go dirisa metswedi ya tshedimoseo, go akaretsa saense e e leng karolo ya maitemogelo a batho mo puong ya setšhaba.

**4****GO GODISA DIKGATLHEGO TSA S&T LE GO AGA SETŠHABA SE SE ROTLOETSANG SETSO SA SAENSE**

Bogolo le phitlhelelo ya mananeo a ga jaana a go nna le seabe mo go tsa saense di tshwanetse go atolosiwa, mme mananeo a masha a a nang le diteng tse di maleba le tse di kgatlhang a tshwanetse go simololwa le go itsisiwe ka ditsela tse di farologaneng. Mananeo ano a tshwanetse go nna le maikaelelo a go tsenya setso sa go batla go itse saense le dipatlisiso mo setšhabeng.

**5****GO ITSE, GO KGATLHEGELA, LE GO TSAYA S&T GO TSWAGANETSE KA NTLHA**

Go tlhoma mogopolo mo dilong tse o di kgatlhegelang go ka nna ga dira gore go nne motlhofo go tsenelela. Seno se ka dira gore go nne le modikologo o o tshwanang mme go nne le melemo e mengwe le ditlamorago tse dingwe tse di amanang le dikgato tse dingwe tse di sekasekilweng mo thutopatlisisong eno, tse di jaaka go nna le kitso le go amega.

**6****DITIRISANO TSA GO RUTA LE DIKGATLHOGO TSA MO LELAPENG**

Mo tshakatshekong eno yotlhe, selo se se neng se tlhomologile thata e ne e le go tshegetsa thuto kwa gae ka go kgothaletsa bana go bala, go dira tiro ya sekolo le go tlotla ka dikgang, mmogo le go dira sentle le go ithuta dithuto tsa saense kwa sekolong. Go tshegetsa thuto ya kwa gae go bontsha botlhokwa jwa go batla go itse le go aga kitso mo gare ga dikokomana.

**7****DIKGOLOGO TSA KGOLOGELO YA GO ITSEBA, JWA GANTSI JWA GO ITSEBA LE GO ITSEELA S&T KE TSE DI LENG TSOTLHE KA BOTSHELO**

Go tiisa le go aga mo godimo ga dikakanyo tseno go tlhoka go netefatsa tsamaiso ya setso e e tlotlang, e tlotlomatsa le go rotloetsa S&T. Re tshwanetse go tlhama tikologo ya setso e e supang dithulaganyo tsa go tsaya ditshwetso tse di theilweng mo bosuping, dingangisano, go tshwaya diphoso le go ganetsa megopolo.

**8**

## **MAEMO A KITSO YA SEANSE LE PHITLHELO, GO TLHAGELELAGA TSHEDIMOSETSO YA SAENSE LE THEKENOLOJI MMOGO LE GO E DIRISIA DI FAROLOGANE KA TLHAGO**

Dintlha tse di botlhokwa tse di bontshang pharologano eno ke thutego, maemo a itsholelo le go nna moithuti kgotsa motho yo o ithutang. Tlhaeletsano e e oketsegileng ya saense le go nna le seabe ka ditsela tse dintsi, go tswa mo dikgatisong go ya go kgaso le go ya go metswedi ya tshedimosetso ya loago, di tshwanetse go rotloediwa le go tlhonga.

**9**

## **GO OTSOFATSA GO FITLHELELA DITLHOGO TSA S&T**

Dikwatara di le tharo tsa batho di kgona go tsema mo Internet. Batho ba ikanya dikgang tsa S&T tse di tlhagisiwang mo thebiseneng le mo radiong mme ba kelotlhoko ka dikgang tsa S&T mo metsweding ya tshedimosetso ya loago. Tshedimosetso ya S&T e tshwanetse go neelwa ka ditsela tse di tlhaganyesegang motlhofo, segolobogolo mo thebiseneng le mo radiong.

**10**

## **DIPHAROLOGANO TSE DIKGOLO MO BOITSHWARONG JWA GO NNA LE SEABE GA SAENSE DI TSWELETSE MME DI KA TLHOTLHELETSA KA GO ROTLOETSA KITSO LE KGATLHEGO YA SAENSE LE GO FENYA DIKGORELETSI TSA SEBOPEGO GO FITLHELELA PHITLHELELO YA TSHEDIMOSETSO**

Ka kakaretso, go ne ga lemogiwa fa go na le selekanyo se se kwa tlase sa go nna le seabe mo go tsa saense mo mefuteng yotlhe ya go nna le seabe. Go solofelwa gore matsholo a go rotloetsa go dirisa tshedimosetso, go kgatlhegela le go nna le kitso, mmogo le maitenko a go rotloetsa go fitlhelela mafelo a S&T le ditiragalo ka tsela e kgolwane, go tla nna le ditlamorago tse di siameng mo maemong a go nna le seabe mo saenseng.

**11**

## **GO RUTA BATHO KA BOTLHOKO JWA SETSHWANTSHO LE TSE DINGWE TSE DINGWE TSA SETSHWAO**

Go na le tlhokego ya maitenko a a kopanetsweng go buisana, go itsise, go ruta, go keteka le go dira gore batho ba nne le kitso ka ga lefapha le le humileng leno la S&T.

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Lefatshe ka Bophara Dithoto tsa meepo Tlholego  
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Kalafi Daithomo Dithunya  
Diokobatsi Batho Thekenoloji  
Atemosefere Metsi Dilaboratori  
Dintlha Dikhebole Batswakwa Ngwedi  
Nako Bodumedi Ditshidifatsi  
Botshelo jwa letsatsi le letsatsi  
Saense ya Thutatshelo Khemiseteri Gase  
Dikhemikale Go gatela pele  
Tlhatlhobo Metswedi Dikgolagano  
Dikgethelo Thulaganyo ya letsatsi Kgoka  
Popo ya Modimo Dikgopolo Ditswaiso  
Di founu tsa Selula Maatla Ditshedi Lefatshe Dimela

Didirisiwa tse dingwe Metswedi ya tshedimosetso  
Go sekaseka Dikago Go gatela pele Saense  
Di-hoover Letsatsi Setofo Eskom  
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Dijo HiFi Motlha Di-plug Didirisiwa  
Di-earphone Didirisiwa tsa eleketeroniki  
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Tshipi Dikhamera helebishene Motšhine  
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Lobone GPS Phefo Bese ATM  
Mmino Letsatsi Diroboto Tshedimosetso Seesemane  
Dikhomputara Motlakase  
Tiro ya dibanka Maitemogelo Dikhampani  
LCD Temothuo WiFi AI Di-hologram  
Go tlhola ditiro CD Tsa ikonomi  
IR Pampiri Diterena Difouno tsa selula  
Maatla Metšhine Tiro ya go aga Kgatelelo  
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