



ACLOC (*LOW COST AND PORTABLE PH METER & THERMOMETER*)

UNTUK PENGAYAAN KURIKULUM KAPASITAS GURU DAN SISWA SMK TENTANG UJI MUTU PRODUK CAIR DENGAN DIGITAL FABRICATION

Oleh:

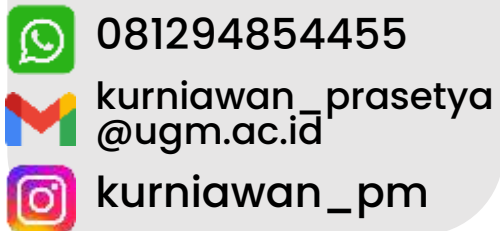
1. Muhammad Prasetya Kurniawan, S.T.P., M.Sc
2. Probo Santoso, S.Hut.,M.Sc.
3. Dr. Setyawan Bakti Wibowo, ST,M.Eng.
4. Dr. Ir. Nurulia Hidayah, SPt.,MP, IPM



OUR TEAM



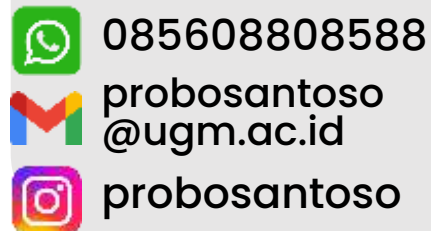
**Muhammad Prasetya
Kurniawan, S.T.P., M.Sc.**



*Agro-Industrial Sustainable
Assessment & Quality*



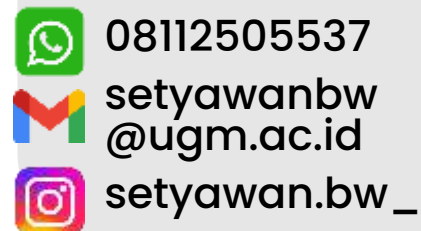
**Probo Santoso, S.Hut.,
M.Sc.**



*Open Space Planning &
GHG Mitigation*



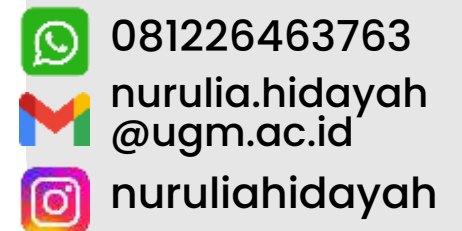
**Dr. Setyawan Bakti
Wibowo, S.T., M.Eng**



*Computer Numerical
Control & Mechanical*

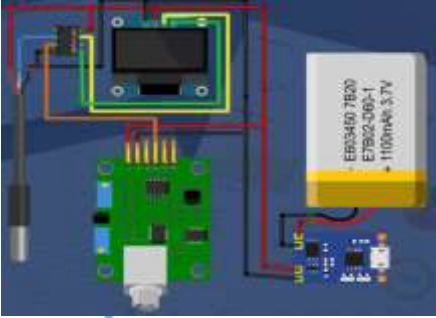


**Dr. Ir. Nurulia Hidayah,
S.Pt., MP., IPM**



*Dairy Production and
Veterinary*





Mei-Juni 2023

Juli 2023

Agustus 2023

September 2023

Oktober 2023

Agenda Kegiatan

Diseminasi digital fabrication technology untuk pengayaan kurikulum,
Identifikasi dan penyamaan persepsi kegiatan
Identifikasi sarana dan prasarana pembelajaran SMK N 1 Nanggulan dan identifikasi potensi sumber daya lokal

Pemilihan objek untuk pembelajaran siswa serta perbaikan dan kalibrasi sarana-prasarana pendukung
Penyiapan modul awal untuk pre-training
Pelaksanaan pre-training, evaluasi dan perbaikan di FRC UGM

Peningkatan keterlibatan mitra (SMKN 1 Nanggulan)

Penyiapan modul dan penilaian pengayaan kurikulum
Diseminasi ke sekolah (Pamong, guru, siswa, dan karyawan)
Simulasi pelaksanaan pembelajaran dan penilaian oleh guru serta respon kemampuan siswa di SMKN 1 Nanggulan

Peningkatan keterlibatan mitra (SMKN 1 Nanggulan dan masyarakat Wijimulyo)

Adopsi digital fabrication technology untuk penguatan kapasitas pembelajaran SMK N 1 Nanggulan

- Teori Pembelajaran teknologi
- Model penyampaian oleh guru
- Penilaian dan respon kemampuan siswa
- Feedback dan evaluation

Pelaporan, Diseminasi, Replikasi, dan publikasi

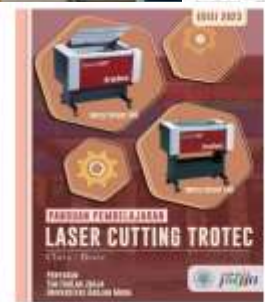
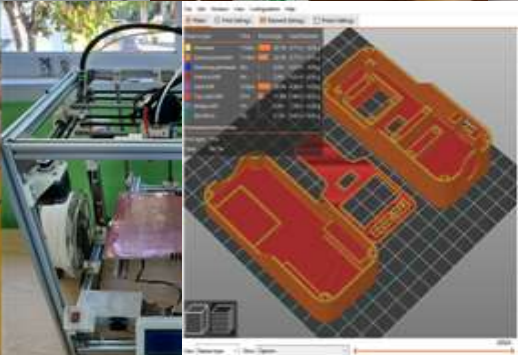
- Pelaporan kegiatan dan video
- Diseminasi hasil untuk harmonisasi dengan mata pelajaran lain
- Penyusunan artikel ilmiah

Best practice untuk instrument (menanamkan esensi kegiatan agar lebih bisa diterima/direplikasi)



No	Kegiatan Utama	Indikator Keberhasilan	Hasil (s.d. Oktober 2023)	Capaian Target
1.	Short training digital fabrication dan purwarupa (digital pH dan filter untuk penguatan implementasi SDG 6)	Partisipasi dan kontribusi peserta, materi, dan assessment	Terlaksananya kegiatan, feedback, dan tindak lanjut.	100%
2.	Pengambilan, pengujian sampel air, assessment dan diseminasi (SDG 6)	Partisipasi dan kontribusi peserta, materi, dan assessment	Terlaksananya kegiatan dan diseminasi	100%
3.	Penyusunan modul untuk pengayaan pembelajaran	Modul tersusun dan terverifikasi	Modul terdiseminasi dan mendapat feedback untuk evaluasi	100%
4.	Penyusunan video untuk pengayaan praktik & tutorial	Video pembelajaran dan terverifikasi	Video terdiseminasi dan mendapat feedback untuk evaluasi	100%
5.	Penyusunan artikel ilmiah	Manuskrip	Submitted manuscript	100%





Identification of Physical and Chemical Quality Standards for Water and Sanitation Sources as Implementation of SDG 6 (Study in Wijimulyo, Nanggulan, Kulon Progo Regency)

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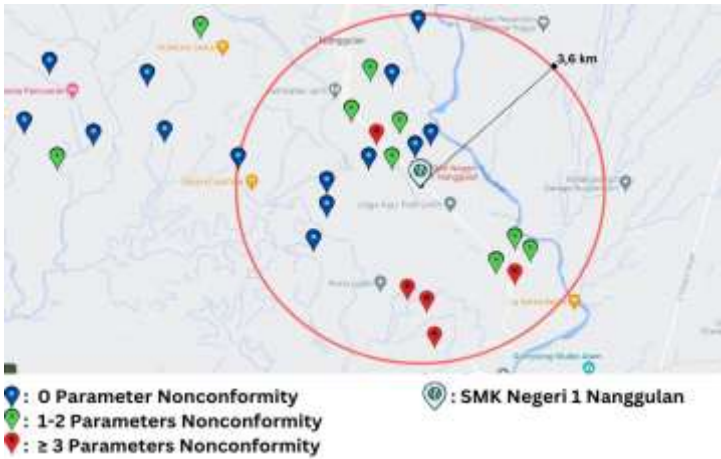
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ABSTRACT

Strategies to implement Sustainable Development Goal (SDG) 6, which relates to clean water and sanitation, in the context of educating vocational teachers and students so that it can be delivered to the community, require synergy between academics, teachers, students, village civil servants, and the community. Dissemination of SDG 6 on clean water and proper sanitation requires monitoring, evaluation, and promotion to increase awareness of the sustainability of clean water sources. Sampling was conducted using the purposive sampling method. The number of samples was 63 water samples were taken from water sources in each resident's house and tested water samples using a Multi-parameter Water Quality Checker and out data processing based on spatial. The results showed an average TDS value of 267 mg/l; turbidity of 0.4 NTU; temperature of 24.1°C; conductivity of 0.4 mS/cm; pH 7.1; salinity 0.2 ppt; and DO 5.9 mg/l. Based on these average values, the water quality has met the water quality standards of the Minister of Health of the Republic of Indonesia Regulation No. 2 Year 2023 and Indonesian National Standard 3553:2015. However, based on the result of tracing each sampling point there are several samples that do not meet water quality standards due to high mineral content in the water, weather factors, waste contamination, proximity to the location of the beach (sea water), and soil erosion. Scenarios for raising awareness about water quality standards need to be carried out in every school and community institution, strategies for implementing water quality management that involves the community and collaboration with government, NGOs, and the private sector in the implementation of SDGs 6, also regular monitoring and evaluation related to water quality.

KEYWORDS: mitigation, quality control, sanitation, SDG 6, water quality standards

Table 1. Water Sample Testing Parameter Formula			
Parameters	Formula	Description	Reference
pH	$\text{pH} = -\log[\text{H}^+]$	$[\text{H}^+]$: Ion concentration	(Covington, 1989)
TDS	$\text{TDS (ppm)} = \text{EC} (\mu\text{S/cm at } 25^\circ\text{C}) \times 0,64$	EC: Electrical conductivity	(Zamora <i>et al.</i> , 2016)
	$\text{TDS (mg/L)} = \frac{(A-B) \times 1000}{\text{volume sampel (mL)}}$	A = weight of dry residue + vaporizer dish (mg) B = weight of empty vaporizer dish (mg)	SNI 3554:2015
Temperature	-	-	-
Turbidity	$\text{Turbidity} = (2,3 \times A)/L$	A = Light absorption L = Optical length	(Len, 2023)
Salinity	$\text{S} = 0,30 + 1,805 \times \text{K}$	K = Chlorinity	(Prakosa <i>et al.</i> , 2020)
Dissolved Oxygen	$\text{Dissolved Oxygen (mg/l)} = \frac{V \times N \times 8000 \times F}{50}$	V = $\text{Na}_2\text{S}_2\text{O}_3$ (ml) N = Normality $\text{Na}_2\text{S}_2\text{O}_3$	SNI 06-6989.14-2004
		F = factor (bottle volume divided by bottle volume minus volume of MnSO_4 reagent and alkali iodide azide)	
Electrical Conductivity	-	-	-



Conclusion

Water samples that have been tested obtained average value results in accordance with TDS quality standards of 265 mg/l; turbidity by 0.4 NTU; temperature of 24.1°C; conductivity of 0.4 mS/cm; pH 7.1 ± 0.7; salinity 0.2 ± 0.1 ppt; and DO 5.9 ± 0.8 mg/l. The overall sample showed that 46.4% had met water quality standards and 53.6% had not met water quality standards with non-conformity generally at high values of TDS, salinity, and turbidity parameters. The three parameter values have high values influenced by geological conditions, weather, waste contamination, and location proximity to the coast. Dissemination of SDG 6 that can be pursued, including awareness-raising education on SDG 6 issues in schools and communities, community involvement and collaboration with the government, NGOs, and the private sector in implementing SDG 6 programs, and regular monitoring and evaluation related to water quality.

Table 2. Specifications of Horiba U-50 Multi-parameter Water Quality Checker

Aspects	Sub-aspects	Specifications
Sensor probe	Measurement temperature	-10 s.d 55°C
	Max. sensor diameter	96 mm
	Probe length	340 mm
	Cable length	Standard: 2 metres
	Mass	1.800 grams
	Measurement depth	Max. 30 meters
Control unit	Dimensions	115 (W) x 66 (D) x 283 (H)
	Mass	800 grams
	LCD	320 x 240
	Data memory	10.000
	Battery	Battery C x 4
	Battery power	70 hours (500 measurements)
	Storage temperature	-10 s.d 60°C

Table 3. Physical and Chemical Water Quality in Wijimulyo, Nanggulan, Kulon Progo Regency

No	Parameter	Mean ± sd	Min-Max	Med	Quality Standard		Unit
					Clean Water	Drinking Water	
A. Physical							
1.	TDS	267 ± 43	179 – 389	263	< 300	< 300 ¹	mg/l
2.	Turbidity	0.4 ± 0,3	0.0 – 1.0	0.3	< 3 ²	< 1,5 ³	NTU
3.	Temperature	24.1 ± 1,0	23 – 26	23.7	± 3 air temperature	± 3 air ⁴ temperature	°C
4.	Electrical Conductivity	0.4 ± 0.16	0.03 – 0.95	0.36	0.02 – 0.5 ⁵	≤ 0.4 ⁶	mS/cm
B. Chemical							
1.	pH	7.1 ± 0.4	6.2 – 7.8	7.2	6.5 – 8.5	6.5 – 8.5 ⁷	-
2.	Salinity	0.2 ± 0.1	0.1 – 0.5	0.2	≤ 0.5 ⁸	≤ 0.2 ⁹	ppt
3.	DO	5.9 ± 0.8	3.9 – 7.7	5.8	≥ 4	≥ 4 ¹⁰	mg/l





obrigado

Dank U

Merci

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спасибо

Grazie

Thank
you

mawuuru

Takk

Gracias

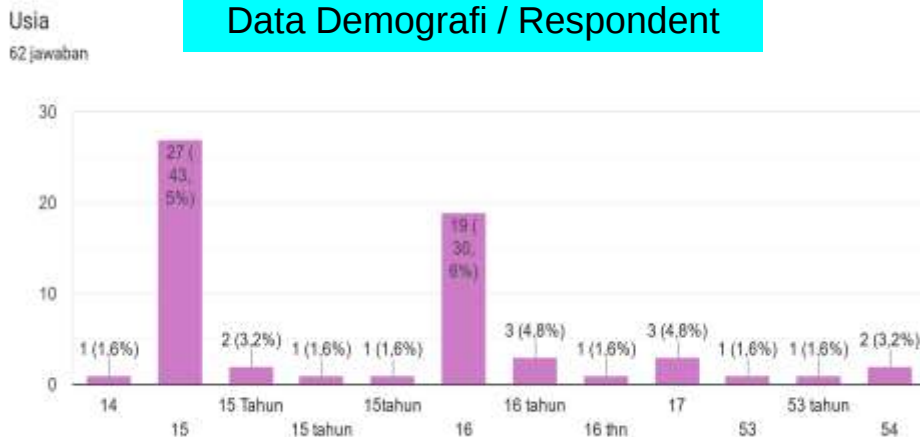
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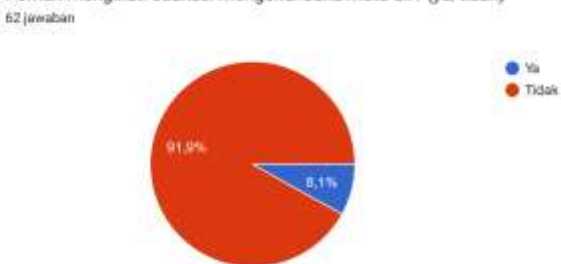
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Data Demografi / Respondent



Pernah mengikuti edukasi mengenai baku mutu air? (ya/tidak)

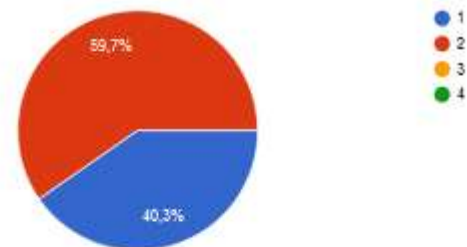


Jika jawabannya iya, sebutkan



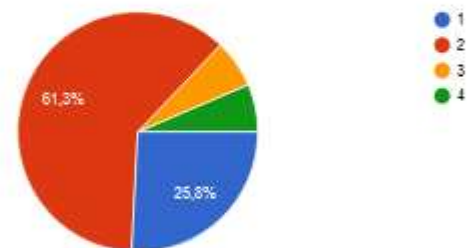
Sumber air untuk MCK saat ini masih sangat layak

62 jawaban



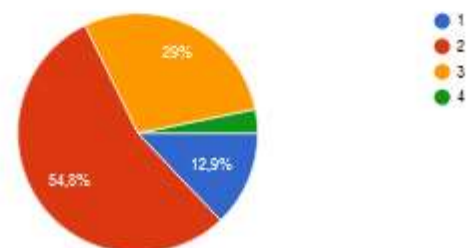
Sampai saat ini belum ada masalah terkait penggunaan air sumber.

62 jawaban



Saya memiliki kemampuan mengidentifikasi mutu dan keamanan air minum.

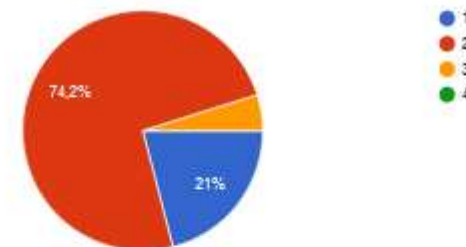
62 jawaban



Knowledge Aspects

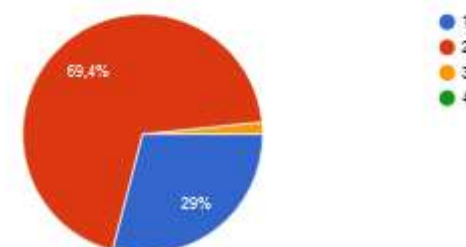
Transparansi kondisi baku mutu air setempat untuk masyarakat.

62 jawaban



Adanya kader/tim pelaksana tingkat desa diperlukan untuk mengawal program perlindungan baku mutu air.

62 jawaban



1 = Sangat Setuju

2 = Setuju

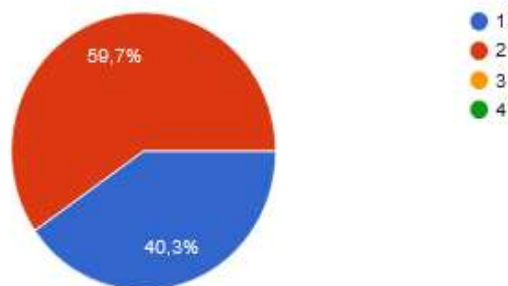
3 = Tidak Setuju

4 = Sangat Tidak Setuju

Knowledge Aspects

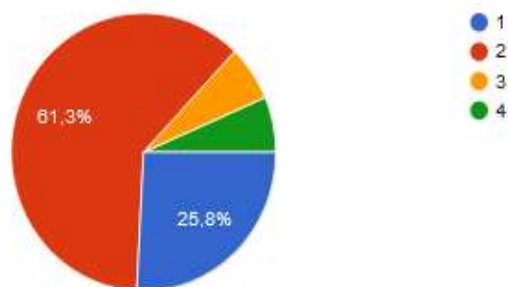
Sumber air untuk MCK saat ini masih sangat layak

62 jawaban



Sampai saat ini belum ada masalah terkait penggunaan air sumber.

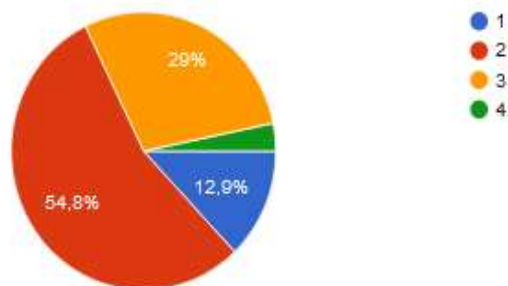
62 jawaban



Knowledge Aspects

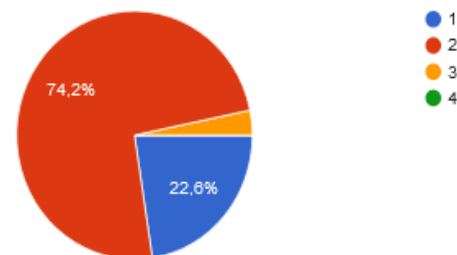
Saya memiliki kemampuan mengidentifikasi mutu dan keamanan air minum.

62 jawaban



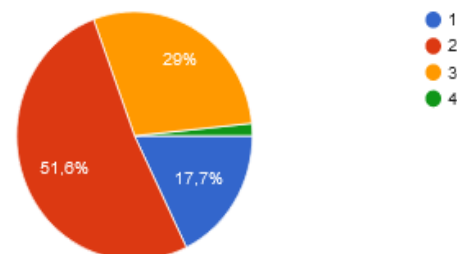
Saya telah melaksanakan sanitasi dan menjaga mutu serta keamanan sumber air.

62 jawaban



Saya memiliki dan mengoperasikan perangkat untuk menjaga baku mutu air.

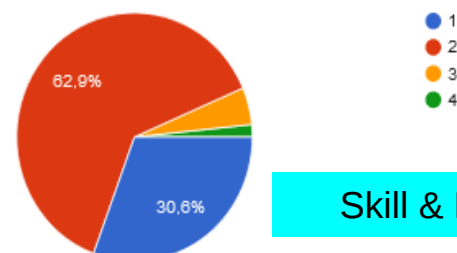
62 jawaban



Pemantauan Baku Mutu Air

Menguji dan memantau secara berkala kualitas air sumber dan sungai sangat penting dilakukan setiap rumah tangga.

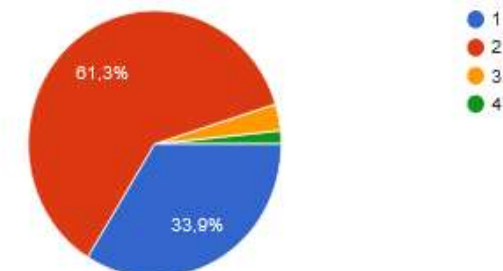
62 jawaban



Skill & Experience Aspects

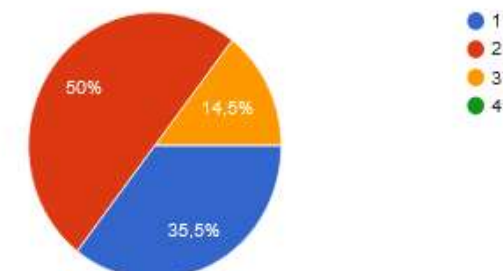
Pengecekan dan pembersihan saluran air menuju sumber harus dilakukan berkala (paling tidak sebulan sekali).

62 jawaban



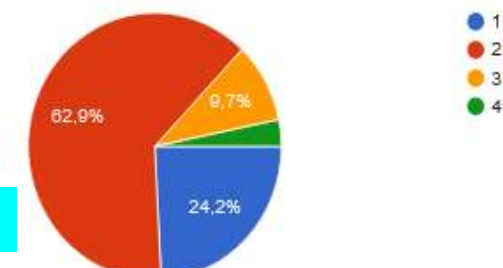
Setiap rumah tangga perlu kemampuan menggunakan bahan penjernih dan pengolah air sederhana.

62 jawaban



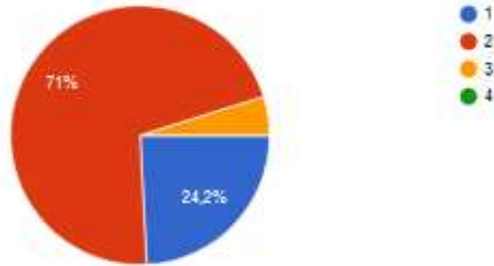
Limbah dari saluran MCK sudah tertangani oleh setiap rumah tangga dengan baik.

62 jawaban



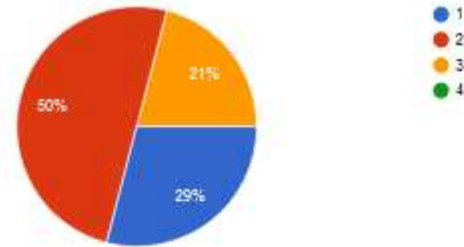
Jarak *septic tank* atau unit penampung/pengelolaan limbah dengan sumber air telah sesuai untuk mengantisipasi rembesan ke sumber air

62 jawaban



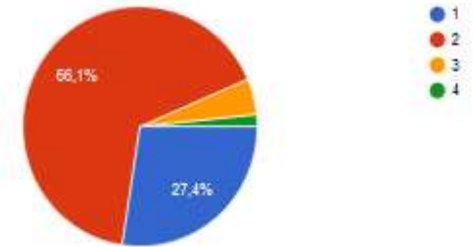
Perlu adanya pemilihan sumber dan penggunaan air (misal: air minum menggunakan air dalam kemasan; untuk mandi dan mencuci menggunakan air sumur/PDAM/sumber lain; dll).

62 jawaban



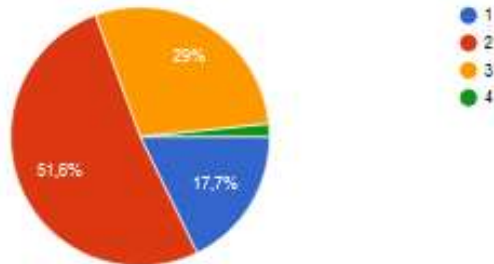
Perlunya aturan (hukum dan insentif) untuk peningkatan kepatuhan.

62 jawaban



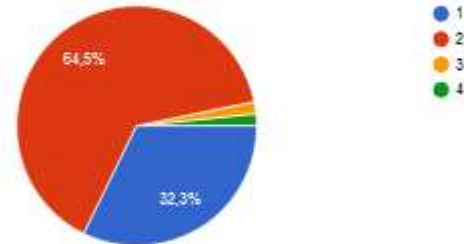
Baku mutu air minum dalam kemasan lebih baik daripada air sumur atau dari PDAM (yang telah direbus).

62 jawaban



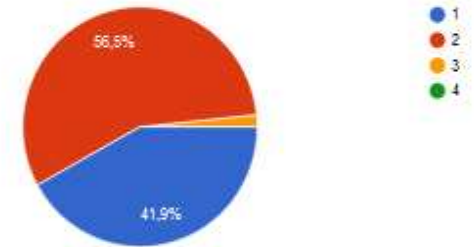
Iklan dan informasi media sosial memberikan edukasi pentingnya baku mutu air.

62 jawaban



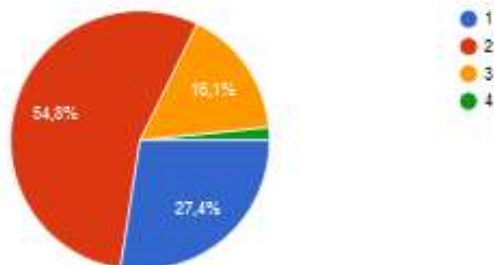
Pamong desa dan pemerintah aktif untuk mendorong PHBS (Perilaku Hidup Bersih dan Sehat) dan Sanitasi lingkungan air.

62 jawaban



Air minum dalam kemasan mudah didapatkan dan harga terjangkau.

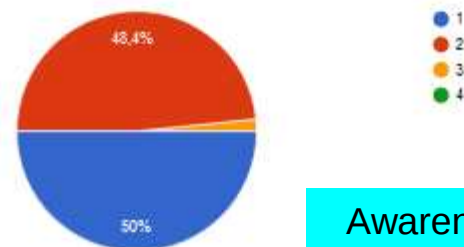
62 jawaban



Peningkatan Kesadaran dan Kemampuan

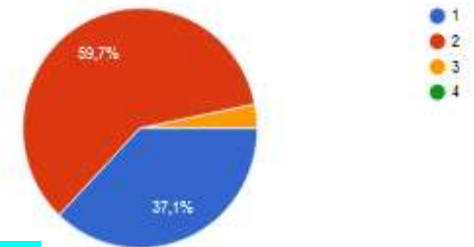
Mengetahui pentingnya menjaga kebersihan dan kegiatan MCK.

62 jawaban



Pamong desa dan pemerintah aktif untuk mendorong PHBS (Perilaku Hidup Bersih dan Sehat) dan Sanitasi lingkungan air.

62 jawaban



Skill & Experience Aspects

Awareness & Attitude Aspects